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# **MANUAL DE BOBINAGEM**

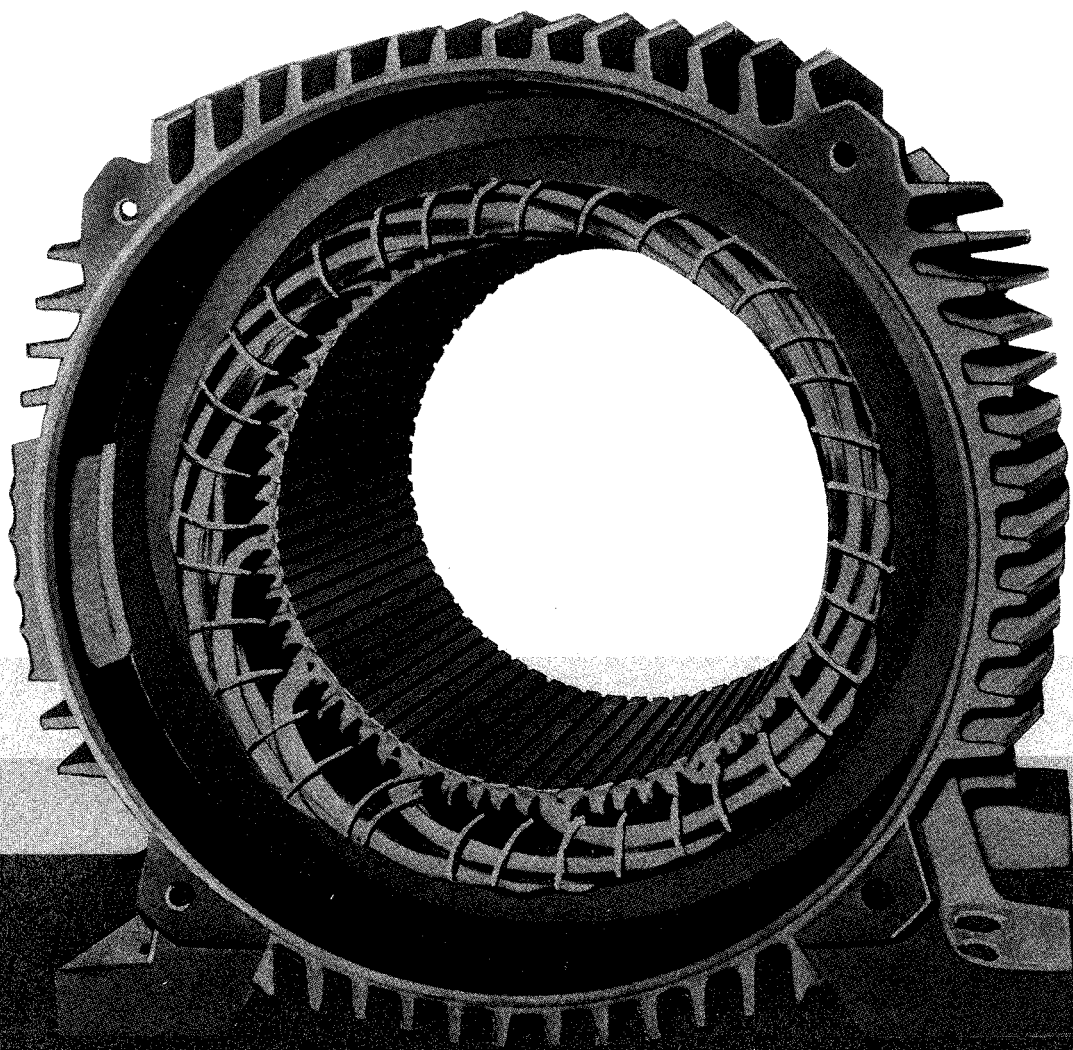
**Motores Elétricos de Indução**

# **WICKELSCHEMEN-HANDBUCH**

**Asynchrone-Induktionsmotoren**

# **WINDING MANUAL**

**Electric Induction Motors**



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## 1. INTRODUÇÃO

Dada a grande amplitude do campo de utilização dos motores elétricos WEG, é natural que muitas vezes estes sejam submetidos a condições de trabalho particularmente adversas, por longas jornadas e com proteção nem sempre eficaz.

É sabido que uma das mais importantes políticas de vendas é justamente a facilidade e rapidez com que os motores são recuperados e colocados novamente em condições de uso.

Visando fornecer aos Assistentes Técnicos subsídios para a rebobinagem de motores elétricos assíncronos de indução, monofásicos e trifásicos, obedecendo às especificações e padrões empregados pela própria fábrica, este manual apresenta uma coletânea de todos os esquemas utilizados, instruções de localização e interpretação, bem como roteiro para cálculo elementar dos dados de bobinagem.

## 1. EINFÜHRUNG

Unter Berücksichtigung der zahlreichen Verwendungsmöglichkeiten für WEG Elektromotoren ist es verständlich, wenn diese oft für längere Zeit unter besonderen Bedingungen und nicht immer zweckentsprechendem Schutz verwendet werden.

Der wichtigste Punkt in der Verkaufspolitik ist die Tatsache, dass die Motoren schnell und mit Leichtigkeit instand gesetzt werden können, um wieder neu verwendet zu werden.

Um die Reparaturwerkstatt bei der Neuwicklung von Einphasen - und Dreiphasenmotoren behilflich zu sein, dass Einzelheiten wie auch Normen der Fabrikation genau beachtet werden sollen, sind in diesem Handbuch Erklärungen über alle gebräuchlichen Diagramme, sowie Instruktionen enthalten, um die Wickelraten zu berechnen.

## 1. INTRODUCTION

Due to the wide range of applications for WEG motors, they are often subject to severe operating conditions for long periods and with inadequate protection.

Repairing, and putting them back into service in the shortest possible time, is one of the most important goals of the WEG Motor Service Policy.

This Manual provides Service Technicians with information concerning the re-winding of induction motors, single and three-phase, following the same specifications and standards used by the Factory. It contains all the winding diagrams normally used, instructions for their selection and interpretation, as well as a procedure for basic winding data calculation.

## 2. CÁLCULO DOS DADOS DE BOBINAGEM – MOTORES TRIFÁSICOS

O roteiro apresentado a seguir tem como finalidade a apresentação de um método prático e simples de cálculo da bitola do fio e quantidade de espiras de motores, cujos dados originais sejam desconhecidos.

É importante observar que, sempre que o motor ainda possuir a bobinagem original, esta deve ser copiada. Isto porque o método aqui apresentado, embora apresente resultados satisfatórios, não conta com os recursos de sofisticação de cálculos e equipamentos existentes na fábrica, que possibilitam um alto grau de otimização das características e racionalização do consumo de material.

Os dados que devem ser copiados da bobinagem original são: dados que constam na placa de identificação, número de ranhuras, números de bobinas, tipo de ligação, número de espiras de cada bobina, forma e dimensões de cada bobina, passo do enrolamento e seção do condutor. Estes dados devem ser os mais completos e exatos possíveis, facilitando assim o rebobinamento do motor.

O roteiro aplica-se a motores assíncronos trifásicos, de indução, rotor de gaiola, totalmente fechados, ventilação externa, (TFVE), polaridade única.

## 2. BERECHNUNG DER WICKELDATEN – DREIPHASENMOTOREN

Nachstehende Ausführungen haben den Zweck, in einfacher und praktischer Art und Weise zu erklären, wie die Berechnung der Drahtstärke und die Anzahl der Wicklungen kalkuliert werden muss, wenn es sich um Motoren handelt, deren Original-Wickelraten unbekannt sind.

Wichtig ist zu beachten, dass, wenn der Motor noch seine Original-Wicklung hat, diese kopiert werden sollte. Das ist deshalb empfehlenswert, weil die in diesem Handbuch ausgeführte Methode, obwohl sie zufriedenstellende Resultate ergibt, nicht über die modernen Einrichtungen der Fabrik verfügt, die einen hohen Grad an Genauigkeit und optimalen Materialverbrauch ermöglichen.

Von der Originalwicklung müssen folgende Daten kopiert werden: Angaben die auf dem Leistungsschild vermerkt sind, Anzahl der Nuten, Anzahl der Spulen, Typ der Schaltung, Anzahl der Windungen für jede Spule, Form und Masse jeder Spule, Wickelschritt, Drahtquerschnitt.

Diese Daten müssen so vollständig und genau sein, um die Neuwicklung des Motors zu erleichtern.

Diese Methode ist anwendbar für Drehstrommotoren, mit Käfigläufer, vollkommen geschlossen, mit Aussenkühlung, Einzelpolzahl.

## 2. CALCULATION OF WINDING DATA – THREE-PHASE MOTORS

The procedure outlined below presents a simple and practical method for determining the wire size and the number of turns per coil, when the original winding data is unknown.

Whenever possible, the original winding should be copied. Although this method usually gives satisfactory results, it does not offer the optimization of performance and materials obtained with the sophisticated methods and equipment used in the Factory.

The data to be copied from the original windings are:

Nameplate data, number of slots, number of coils, type of connection, number of turns per coil, shape and dimensions of coils, winding pitch and wire size. This information should be as complete and accurate as possible, to make the re-winding job easier.

The procedure below applies to squirrel-cage, totally enclosed fan-cooled (TEFC), single speed, three-phase induction motors.

## 2.1. DETERMINAÇÃO DO NÚMERO DE ESPIRAS

### 2.1.1. Dados necessários

- Di – Diâmetro interno do estator (cm)
- L – Comprimento do pacote (cm)
- P – Número de pólos
- N – Número de ranhura do estator
- B – Indução estimada no entreferro (5 KGauss)
- f – Frequência da rede (Hz)
- V – Tensão da rede (V)

### 2.1.2. Procedimento

- a) Localizar o esquema a ser utilizado, conforme instruções do capítulo 4, determinando o **passo médio de enrolamento (p)**.
- b) A partir do passo médio, **determinar o fator de enrolamento ( $\xi$ )**, pela Tabela de Dados Técnicos para escolher ou modificar o Passo do Enrolamento (ANEXO 2).

## 2.1 FESTLEGUNG DER ANZAHL VON WINDUNGEN

### 2.1.1 Erforderliche Daten

- Di – Innendurchmesser des Stators (cm)
- L – Paketlänge
- P – Anzahl der Pole
- N – Anzahl der Statornuten
- B – Geschätzte Induktion des Luftspaltes (5 KGauss)
- f – Netzfrequenz (Hz)
- V – Netzspannung (V)

### 2.1.2 Verfahren

- a) Bestimmung des anzuwendenden Schemas, gemäss Instruktion Kapitel 4, **Mittelschritt der Wicklung** bestimmen (p).
- b) Ausgehend vom Mittelschritt, **Wicklungsfaktor ( $\xi$ )** mit Hilfe der Tabelle technische Daten bestimmen, um den Wickelschritt auszuwählen oder zu ändern (Anlage 2).

## 2.1 DETERMINATION OF NUMBER OF TURNS

### 2.1.1 Required data

- Di – Internal diameter of stator (cm)
- L – Length of stack (cm)
- P – Number of poles
- N – Number of stator slots
- B – Estimated flux-density in Air Gap (5 KGauss)
- F – Supply frequency (Hz)
- V – Supply voltage (V)

### 2.1.2 Procedure

- a) Select the diagram to be used, according to instructions in chapter 4, and determine the **mean winding pitch (p)**.
- b) From the mean winding pitch, determine the winding factor ( $\xi$ ). Refer to the Technical Data Table (Appendix 2) to select or modify the winding pitch.

c) Calcular o Passo Polar (tp):

$$t_p = \frac{3,14 \times D_i}{P} \quad (\text{cm})$$

d) Fluxo magnético estimado ( $\phi$ ):

$$\phi = \frac{B \times t_p \times L}{1000} \quad (\text{MMaxwel})$$

e) Número de espiras por fase (ZF):

$$ZF = \frac{50 \times V}{2,22 \times \phi \times f \times \xi} \times \frac{k \times k_1}{k_2}$$

Onde: k = 1 Para enrolamento em camada dupla  
k = 2 Para enrolamento em camada única  
k1 = Número de ligações em paralelo para tensão especificada  
k2 = 1 Para ligação em triângulo  
k2 = 1,73 Para ligação em estrela

c) Berechnung des Polschrittes (tp):

$$t_p = \frac{3,14 \times D_i}{P} \quad (\text{cm})$$

d) Geschätzter magnetischer Fluss ( $\phi$ ):

$$\phi = \frac{B \times t_p \times L}{1000} \quad (\text{MMaxwel})$$

e) Anzahl der Windungen pro Phase (ZF)

$$ZF = \frac{50 \times V}{2,22 \times \phi \times f \times \xi} \times \frac{k \times k_1}{k_2}$$

Erklärung: k = 1 für Wicklung in Doppelschicht  
k = 2 für Wicklung in Einzelschicht  
k1 = Zahl der Parallelanschlüsse für eine Spannung  
k2 = 1 für Dreieckschaltung  
k2 = 1,73 für Sternschaltung.

c) Calculate the Pole pitch (tp):

$$t_p = \frac{3,14 \times D_i}{P} \quad (\text{cm})$$

d) Estimated magnetic flux ( $\phi$ ):

$$\phi = \frac{B \times t_p \times L}{1000} \quad (\text{MMaxwel})$$

e) Number of turns per phase (ZF)

$$ZF = \frac{50 \times V}{2,22 \times \phi \times f \times \xi} \times \frac{k \times k_1}{k_2}$$

Where: k = 1 for double-layer winding  
k = 2 for single-layer winding  
k1 = number of connections in parallel for specified voltage  
k2 = 1 for delta connection.  
k2 = 1,73 for star connection.

f) Número de espiras por bobina (Z):

$$Z = \frac{3 \times ZF}{N}$$

O valor adotado deverá ser o número inteiro mais próximo.

Para valores muito pequenos de Z, quando este arredondamento for superior a 5%, é necessário a escolha de esquema com maior número de ligações em paralelo, aumentando-se assim o número de espiras e minimizando o erro.

## 2.2. DETERMINAÇÃO DA BITOLA DO FIO

a) A seção do fio a ser usado pode ser determinada pela formula:

$$S = \frac{l \times k2}{d \times 1,73 \times k1}$$

f) Anzahl der Windungen für die Spule (Z):

$$Z = \frac{3 \times ZF}{N}$$

Der angenommene Wert muss der ganzen Zahl am nächsten sein.

Für sehr kleine Z Werte, wenn die Abrundung mehr als 5% beträgt, ist es notwendig die Schaltung mit einer grösseren Zahl von Parallelanschlüssen zu wählen, dadurch erhöht sich die Anzahl der Windungen und verringert sich der Fehler.

## 2.2 BESTIMMUNG DER DRAHTSTÄRKE

a) Das zu verwendende Drahtprofil wird mit folgender Formel bestimmt:

$$S = \frac{l \times k2}{d \times 1,73 \times k1}$$

f) Number of turns per coil (Z):

$$Z = \frac{3 \times ZF}{N}$$

The value used must be the integer closest to the calculated value.

For very low Z values, when rounding error is over 5%, it is necessary to select a diagram with a larger number of connections in parallel, therefore increasing the number of turns and reducing the error.

## 2.2 DETERMINATION OF WIRE SIZE

a) The cross section of wire to be used can be determined by the following rule:

$$S = \frac{l \times k2}{d \times 1.73 \times k1}$$



Onde  $S$  = Seção do fio, em  $\text{mm}^2$

$I$  = Corrente nominal do motor (obtida da placa de identificação do motor ou do catálogo)

$d$  = Densidade de corrente, escolhida em função da potência do motor conforme abaixo:

Menores ou iguais a 10CV: até  $7 \text{ A/mm}^2$

De 10 a 50CV: no máximo  $5,5 \text{ A/mm}^2$

Acima de 50CV aconselhamos a consulta à Fábrica, face às características muito peculiares de cada motor.

$k1$  e  $k2$  = Conforme definidos no item 2.1.2. letra "e" (número de espiras por fase).

b) A bitola do fio é obtida através da Tabela do Fio de Cobre Esmaltado (Anexo 1), onde escolhe-se aquela correspondente à seção normalizada imediatamente superior a calculada. No ANEXO 3, apresentamos uma Tabela Comparativa das Bitolas do Sistema AWG e do Sistema Métrico e a respectiva variação percentual da área da seção transversal.

Erklärung:  $S$  = Drahtprofil in  $\text{mm}^2$

$I$  = Nennstrom des Motors (ersichtlich auf dem Leistungsschild oder Katalog)

$d$  = Stromdichte, ausgewählt in der Leistungsfunktion des Motors, wie nachstehend:

Kleiner oder gleich bis 10 PS:  $7 \text{ A/mm}^2$

Von 10-50 PS: höchstens  $5.5 \text{ A/mm}^2$

Über 50 PS raten wir in der Fabrik anzufragen, wegen der besonderen Eigenschaften jedes Motors.

$k1$  und  $k2$  = Wie unter Punkt 2.1.2 Buchstabe "e" beschrieben (Windungsanzahl pro Phase).

b) Die Drahtstärke wird mit Hilfe der Tabelle für emaillierten Kupferdraht (Anlage 1) bestimmt und diejenige ausgewählt wird, die dem Normalprofil entspricht und unmittelbar über der berechneten liegt. Anlage 3 enthält eine Vergleichstabelle der Drahtstärken System AWG und des metrischen Systems, wie auch die entsprechenden prozentualen Variationen der Querschnittfläche.

Where:  $S$  = Cross section of wire in  $\text{mm}^2$

$I$  = Rated current of motor (from the nameplate of the motor or from the catalogue)

$d$  = Current density, selected by horse power of motor, as follows:

Under or equal to 10HP: up to  $7 \text{ A/mm}^2$

From 10 to 50HP: maximum  $5.5 \text{ A/mm}^2$

Over 50HP we recommend consulting the factory because of the peculiar characteristics of each motor.

$k1$  and  $k2$  = as specified in item 2.1.2 letter "e" (number of turns per phase).

b) The diameter of wire is obtained in the enamelled copper wire table (Appendix 1), where the size which corresponds to the standardized section immediately above the calculated one is selected. In Appendix 3, a comparison table between gauges of the AWG system and the METRIC system is shown, as well as the corresponding percentage variation of the cross sectional area.

### 2.3. AJUSTE FINAL – FATOR DE ENCHIMENTO

A relação entre a seção de cobre dos fios e a área da ranhura é chamada FATOR DE ENCHIMENTO, cujos valores ideais são apresentados a seguir, para vários tamanhos de ranhuras:

Área de ranhura (mm <sup>2</sup> )	Fator de enchimento
30 - 50 - 75 - 100 - 150	0,28 - 0,32 - 0,37 - 0,40 - 0,43

Valores muito abaixo deixarão os fios muito soltos dentro das ranhuras; valores acima aumentarão consideravelmente o tempo de inserção das bobinas.

No campo a determinação da área da ranhura é pouco prática, porém por experiência ou por tentativas poderá ser feito o **ajuste final** do número do fio, caso o enchimento fique muito alto ou muito baixo.

OBS.: O ajuste na fábrica é feito a partir de ensaios e cálculos precisos, sempre tomando-se em conta a elevação de temperatura do motor e buscando-se valores ótimos das demais características.

Por isso deve-se desconfiar se o ajuste resultar em valores de densidade de corrente em completa discordância dos valores apresentados como típicos.

O máximo fator de enchimento executável, para fios de Seção circular, está em torno de 0,45.

### 2.3 ENDAUSGLEICH – FÜLLFAKTOR

Das Verhältnis zwischen Drahtprofil und Nutenfläche wird mit FÜLLFAKTOR bezeichnet, dessen ideale Werte für verschiedene Nutgrößen nachstehend angeführt sind:

Drahtprofil (mm <sup>2</sup> )	Füllfaktor
30 - 50 - 75 - 100 - 150	0,28 - 0,32 - 0,37 - 0,40 - 0,43

Bei sehr niedrigen Werten würden sich die Drähte lose zwischen den Nuten befinden, höhere Werte würden die Zeit des Einsetzens der Spulen beträchtlich erhöhen.

Anmerkung: Der Ausgleich in der Fabrik ist aufgrund von erforderlichen Prüfungen und Berechnungen erfolgt, die Temperaturerhöhung des Motors wurde berücksichtigt und ausgezeichnete Werte, den charakteristischen Verlauf betreffend, erzielt.

Infolgedessen muss man misstrauisch sein, wenn der Endausgleich für die Stromdichte Werte ergibt, die zu den als typisch angegebenen im kompletten Gegensatz stehen.

Der grösste, ausführbare Füllfaktor für Drähte mit kreisförmigem Querschnitt, ist im Kreise 0,45.

### 2.3 FINAL ADJUSTMENT – SLOT PACKING FACTOR

The ratio of the cross section of copper wire to the slot area is called SLOT PACKING FACTOR, the ideal value of which should be as follows:

Slot area (mm <sup>2</sup> )	Slot packing factor
30 - 50 - 75 - 100 - 150	0,28 - 0,32 - 0,37 - 0,40 - 0,43

Very low values will allow the wires to be too loose in the slots; very high values will considerably increase the time taken to insert the coils.

In field work, it is not easy to determine the slot area, but by trial and error, the **final adjustment** of the wire size can be made, in order to achieve the optimum factor.

Note: The adjustment at the factory is made by tests and exact calculation, always taking into consideration the temperature rise of the motor and optimization of other characteristics.

For this reason, it is necessary to be aware if the adjustment results in the values of current density differing completely from the typical values shown.

Maximum allowable Slot Packing Factor for cross section of copper wire should be around 0,45.

### 3. CÁLCULO DE DADOS DE BOBINAGEM – MOTORES MONOFÁSICOS

Valem aqui as mesmas considerações feitas com referência aos motores trifásicos, com as seguintes observações:

- a) Aplica-se a motores monofásicos de indução, rotor de gaiola, condensador de partida, abertos, ventilação interna;
- b) Para potências superiores a 1 CV recomenda-se a consulta à fábrica, face às suas características peculiares de difícil dimensionamento;
- c) Considerar-se-á que os motores poderão funcionar em duas tensões (110/220, por exemplo), que é o caso mais comum.

#### 3.1. DETERMINAÇÃO DO NÚMERO DE ESPIRAS

##### 3.1.1. Dados necessários:

Di – Diâmetro interno do estator (cm)

### 3. BERECHNUNG DER WICKELDATEN – EINPHASENMOTOREN

Hier sind dieselben Überlegungen, die in bezug auf Dreiphasenmotoren gemacht wurden gültig, jedoch unter Beachtung folgender Punkte:

- a) Anwendbar für Einphasen-Induktionsmotoren, mit Käfigläufer, Anlaufkondensator, offen, Innenkühlung;
- b) Für Leistungen über 1 PS empfiehlt es sich bei der Fabrik anzufragen, hinsichtlich der charakteristischen Eigenschaften, sowie schwierigen Messungen;
- c) Es muss berücksichtigt werden, dass die Motoren mit zwei Spannungen (z.B. 110/220 V.) arbeiten können, das ist meistens der Fall.

#### 3.1 FESTLEGUNG DER ANZAHL VON WINDUNGEN

##### 3.1.1 Notwendige Daten

Di – Innendurchmesser des Stators (cm)

### 3. CALCULATION OF WINDING DATA – SINGLE-PHASE MOTORS

The same instructions as given for three-phase motors are applicable, however with some further comments:

- a) This is to apply to induction single-phase motors, with squirrel cage, capacitor start, drip proof, fan cooled;
- b) Over 1 horse power, it is recommended that the factory is consulted because of particularly difficult dimensioning.
- c) It should be considered that the motors may operate on two voltages (e.g. 110/220).

#### 3.1 DETERMINATION OF NUMBER OF TURNS

##### 3.1.1 Required data:

Di – Internal diameter of stator (cm)  
L – Length of stack (cm)  
P – Number of poles

- L – Comprimento do pacote (cm)
- P – Número de pólos
- N – Número de ranhuras do estator
- B – Indução estimada no entreferro (5 kGauss)
- f – Frequência da rede (Hz)
- V – Tensão da rede (V)

### 3.1.2. Procedimento

- a) Localizar o esquema a ser utilizado, conforme instruções do capítulo 4, verificando o passo de enrolamento tanto da fase principal quanto da fase auxiliar;
- b) Determinar, através da tabela I abaixo:
  - Fator do enrolamento da fase principal ( $\xi_p$ )
  - Fator de enrolamento da fase auxiliar ( $\xi_a$ )
  - Fatores de distribuição de espiras da fase principal ( $f_{p1}, f_{p2} \dots f_{pn}$ )
  - Fatores de distribuição de espiras da fase auxiliar ( $f_{a1}, f_{a2} \dots f_{an}$ ).

- L – Paketlänge (cm)
- P – Anzahl der Pole
- N – Anzahl der Statornuten
- B – Geschätzte Induktion des Luftspaltes (5 KGauss)
- f – Netzfrequenz (Hz)
- V – Netzspannung (V)

### 3.1.2 Verfahren

- a) Bestimmung des anzuwendenden Schemas, gemäss Instruktion Kapitel 4, Wickelschritt überprüfen, sowohl in der Haupt – wie auch in der Hilfsphase;
- b) Gemäss Tabelle I unten, bestimmen:
  - Wicklungsfaktor der Hauptphase ( $\xi_p$ )
  - Wicklungsfaktor der Hilfsphase ( $\xi_a$ )
  - Faktoren der Spiralenverteilung der Hauptphase ( $f_{p1}, f_{p2}, \dots f_{pn}$ )
  - Faktoren der Spiralenverteilung der Hilfsphase ( $f_{a1}, f_{a2}, \dots f_{an}$ ).

- N – Number of stator slots
- B – Estimated flux density in Air Gap (5 KGauss)
- f – Supply frequency (Hz)
- V – Supply voltage (V)

### 3.1.2 Procedure

- a) Select the diagram to be used, according to the instructions in chapter 4, checking the winding pitch for both the running and starting winding.
- b) Determine, from table 1, the following:
  - Winding factor of the Running Winding ( $\xi_p$ )
  - Winding factor of the Starting Winding ( $\xi_a$ )
  - Turn distribution factors of the Running Winding ( $f_{p1}, f_{p2}, \dots f_{pn}$ )
  - Turn distribution factors of the Starting Winding ( $f_{a1}, f_{a2}, \dots f_{an}$ )

TABELA I

TABELLE I

TABLE I

Nº ranhuras do estator			Passo do enrolamento (p)	Fator de enrolamento	f <sub>1</sub> , f <sub>2</sub> , . . . f <sub>n</sub> fatores para distribuição de espiras	Número de bobinas p/ grupo
Anzahl der Nuten im Stator			Wickelschritt (p)	Wicklungsfaktor	f <sub>1</sub> , f <sub>2</sub> , . . . f <sub>n</sub> Faktor für die Verteilung der Windungen	Anzahl der Spulen pro Gruppe
Number of stator slots			Winding pitch (p)	Winding factor	f <sub>1</sub> , f <sub>2</sub> , . . . f <sub>n</sub> Factors for distribution of turns	Number of Coils per Group
Polos, Pole, Poles						
II	IV	VI				
	24	36	1: 6 1: 4: 6	0,966 0,857	1,0 0,42; 0,58	1 2
	32	48	1: 6: 8 1: 4: 6: 8	0,912 0,829	0,46; 0,54 0,23; 0,36; 0,41	2 3
18	36		1: 5: 7: 9 1: 6: 8: 10 1: 3: 5: 7: 9	0,855 0,913 0,794	0,26; 0,35; 0,39 0,28; 0,35; 0,37 0,12; 0,23; 0,30; 0,35	3 3 4
24	48		1: 10: 12 1: 8: 10: 12 1: 6: 8: 10: 12 1: 4: 6: 8: 10: 12	0,959 0,855 0,855 0,806	0,48; 0,52 0,29; 0,34; 0,37 0,18; 0,24; 0,28; 0,30 0,10; 0,17; 0,21; 0,25; 0,27	2 3 4 5

c) Calcular o **Passo Polar** (tp)  

$$tp = \frac{3,14 \times Di}{p} \quad (\text{cm})$$

d) Fluxo magnético estimado ( $\phi$ )  

$$\phi = \frac{B \times tp \times L}{1000} \quad (\text{MMaxwel})$$

e) Número de espiras por fase (principal).  

$$Z_p = \frac{V \times 50 \times k_1}{2,22 \times \xi p \times \phi \times f}$$
 onde k<sub>1</sub> = Número de ligações em paralelo para a tensão especificada

f) Número de espiras de cada bobina (principal).  

$$Z_{p1} = \frac{Z_p \times fp1}{p}$$

$$Z_{p2} = \frac{Z_p \times fp2}{p}$$

c) **Polteilung** (tp) berechnen  

$$tp = \frac{3,14 \times Di}{p} \quad (\text{cm})$$

d) Geschätzter magnetischer Fluss ( $\phi$ )  

$$\phi = \frac{B \times tp \times L}{1000} \quad (\text{MMaxwel})$$

e) Anzahl der Windungen pro Phase (Hauptphase)  

$$Z_p = \frac{V \times 50 \times k_1}{2,22 \times \xi p \times \phi \times f}$$

Erklärung . . . . . k<sub>1</sub> = Anzahl der Parallelschaltungen für spezifizierte Spannung

f) Anzahl der Windungen in jeder Spule (Hauptphase)  

$$Z_{p1} = \frac{Z_p \times fp1}{p}$$

$$Z_{p2} = \frac{Z_p \times fp2}{p}$$

c) Calculate the **Pole Pitch** (tp)  

$$tp = \frac{3,14 \times Di}{p} \quad (\text{cm})$$

d) Estimated magnetic flux ( $\phi$ )  

$$\phi = \frac{B \times tp \times L}{1000} \quad (\text{MMaxwel})$$

e) Number of turns per phase (Running Winding).  

$$Z_p = \frac{V \times 50 \times k_1}{2,22 \times \xi p \times \phi \times f}$$

Where k<sub>1</sub> = Number of connections in parallel for specific voltage.

f) Number of turns of each coil (Running Winding).  

$$Z_{p1} = \frac{Z_p \times fp1}{p}$$

$$Z_{p2} = \frac{Z_p \times fp2}{p}$$

$$Z_{pn} = \frac{Z_p \times f_{pn}}{p}$$

g) Número de espiras por fase (auxiliar).

$$Z_a = \frac{Z_p \times \xi_p \times k_3 \times V_a}{\xi_a \times k_1 \times V}$$

onde  $k_3$  = é obtido da tabela II (ítem 3.3.), em função da potência do motor.

$V_a$  = Tensão de trabalho da fase auxiliar.

$Z_p, p, a, k_1, V$  – já definidos anteriormente.

h) Número de espiras de cada bobina (auxiliar).

$$Z_{a1} = \frac{Z_a \times fa1}{p}$$

$$Z_{a2} = \frac{Z_a \times fa2}{p}$$

$$Z_{an} = \frac{Z_a \times fan}{p}$$

### 3.2 DETERMINAÇÃO DA BITOLA DO FIO

**3.2.1 A seção do fio da fase principal pode ser calculada pela fórmula:**

$$S_p = \frac{I}{d \times k_1}$$

onde

$S_p$  = Seção do fio em  $mm^2$

$d$  = Densidade de corrente em  $A/mm^2$

$I$  = Corrente nominal em ampères (obtida da placa de identificação do motor ou do catálogo).

A bitola do fio é obtida através da Tabela do Fio de Cobre Esmaltada do (ANEXO 1), onde escolhe-se aquela correspondente à seção normalizada imediatamente superior.

$$Z_{pn} = \frac{Z_p \times f_{pn}}{p}$$

g) Anzahl der Windungen pro Phase (Hilfsphase)

$$Z_a = \frac{Z_p \times \xi_p \times k_3 \times V_a}{\xi_a \times k_1 \times V}$$

Erklärung  $k_3$  = erhalten aus Tabelle II (Punkt 3.3) in Übereinstimmung mit der Leistung des Motors.

$V_a$  = Arbeitsspannung der Hilfsphase  $Z_p, p, a, k_1, V$  – schon vorher bestimmt.

h) Anzahl der Windungen jeder Spule (Hilfsphase)

$$Z_{a1} = \frac{Z_a \times fa1}{p}$$

$$Z_{a2} = \frac{Z_a \times fa2}{p}$$

$$Z_{an} = \frac{Z_a \times fan}{p}$$

### 3.2 FESTLEGUNG DER DRAHTSTÄRKE

**3.2.1 Das zu verwendende Drahtprofil der Hauptphase kann nach folgender Formel berechnet werden:**

$$S_p = \frac{I}{d \times k_1}$$

Erklärung

$S_p$  = Drahtprofil in  $mm^2$

$d$  = Stromdichte in  $A/mm^2$

$I$  = Nennstrom in Ampère (ersichtlich aus dem Leistungsschild des Motors oder Katalog).

Die Drahtstärke ist ersichtlich aus der Tabelle für emaillierten Kupferdraht (Anlage 1) und man diejenige auswählt, die dem nächst höheren Drahtprofil entspricht.

$$Z_{pn} = \frac{Z_p \times f_{pn}}{p}$$

g) Number of turns per phase (Starting Winding).

$$Z_a = \frac{Z_p \times \xi_p \times k_3 \times V_a}{\xi_a \times k_1 \times V}$$

Where  $k_3$  = it is obtained from table II (item 3.3) according to horse power of motor.

$V_a$  = Working voltage of Starting Winding.

$Z_p, p, a, k_1, V$  – already determined previously.

h) Number of turns of each coil (Starting Winding).

$$Z_{a1} = \frac{Z_a \times fa1}{p}$$

$$Z_{a2} = \frac{Z_a \times fa2}{p}$$

$$Z_{an} = \frac{Z_a \times fan}{p}$$

### 3.2 DETERMINATION OF WIRE SIZE

**3.2.1 The cross section of wire for the Running Winding can be calculated by the following formula:**

$$S_p = \frac{I}{d \times k_1}$$

Where

$S_p$  = Cross section of wire in  $mm^2$ .

$d$  = Current density in  $A/mm^2$ .

$I$  = Rated current in Amperes (obtained from the nameplate of the motor, or from the catalogue).

The wire diameter is obtained from the enamel-covered copper wire table (Appendix 1), where the size, which corresponds to the standard section immediately above the calculated one, is selected.

### 3.2.2 Bitola do Fio da Fase Auxiliar

Como a corrente que percorre a fase auxiliar não é um dado disponível e considerando-se o seu breve período de trabalho, pode-se determinar a bitola, a grosso modo, da seguinte maneira:

- a) Somando-se dois números à bitola do fio da fase principal, se esta estiver ligada em série;
- b) Subtraindo-se um número à bitola da fase principal, caso esta estiver em paralelo.

OBS: Lembrar que isto só é válido se a fase auxiliar estiver prevista para a menor das duas tensões nominais.

Por exemplo: Fase principal calculada para 220, fase auxiliar calculada para 110V.

### 3.3 ESCOLHA DO CONDENSADOR DE PARTIDA

A determinação exata da capacidade requerida é complexa. Porém na prática poderão ser usados os valores da tabela II abaixo, para fase auxiliar ligada em 110V.

### 3.2.2 DRAHTSTÄRKE DER HILFSPHASE

Der die Hilfsphase durchlaufende Strom ist keine verfügbare Grösse und wenn man seine kurze Arbeitsperiode berücksichtigt, kann die Drahtstärke, in grober Form wie folgt bestimmt werden:

Beispiel a) Wenn die Drahtstärke der Hauptphase bekannt ist, dann reduzieren wir den Drahtquerschnitt um ca. 40% der Kraftspule d.h. wenn die Wicklung in Serie geschaltet ist.

Beispiel b) Wenn die Wicklung parallel geschaltet ist, dann werden nur ca. 20% der Kraftspule reduziert d.h. bei parallel geschalteter Wicklung.

Anmerkung: Bitte beachten das gilt nur, wenn vorgesehen wurde, dass die Hilfsphase die Kleinere der beiden Nominalspannungen ist.

Zum Beispiel: Hauptphase für 220 Volt berechnet. Hilfsphase für 110 Volt berechnet.

### 3.3 AUSWAHL DES ANLAUFKONDENSATORS

Die genaue Bestimmung der geforderten Kapazität ist vielfältig. Jedoch in der Praxis können die Werte der nachstehenden Tabelle II für die Hilfsphase in 110 Volt geschaltet, benutzt werden.

### 3.2.2 Wire diameter for the Starting Winding

As the value of the current which flows through the starting winding is not available, and taking into consideration its short period of operation, the diameter can be roughly determined from Appendix 1, as follows:

a) If the Running Winding is connected in series; by choosing from the table a wire gauge two diameters less than the diameter used for the Running Winding, or by adding two numbers to the AWG gauge of the wire used for the Running Winding.

b) If the Running Winding is connected in parallel; by choosing from the table a wire gauge with a diameter one higher than the diameter of the Running Winding or by subtracting one number from the AWG gauge of the wire used for the Running Winding.

Note: This is only valid if the Starting Winding is the lower of the two rated voltages.

### 3.3 DETERMINATION OF STARTING CAPACITOR

Exact determination of the required capacity is too complex. However, in practice, values from Table II below can be used for the Starting Winding when connected for 110V.

TABELA II	TABELLE II	TABLE II
CV	Capacitor ( $\mu F$ )	k3
PS	Kapazität des Kondensators ( $\mu F$ )	k3
HP	Capacitor ( $\mu F$ )	k3
1/4	189 – 227	1,15
1/3	216 – 259	1,28
1/2	216 – 259	1,38
3/4	270 – 324	1,48
1,0	430 – 516	1,60

Para outras tensões, a capacidade deverá variar inversamente proporcional à tensão.

Para tensões maiores, porém, deverá levar-se em conta também a nova tensão nominal do condensador (Vac).

Für andere Spannungen wird die Kapazität umgekehrt zur Spannung geändert.

Jedoch für höhere Spannungen muss auch die neue Nominalspannung des Kondensators (Vac) in Rechnung gestellt werden.

For other voltages, the capacity must vary inversely proportional to the voltage.

However, for higher voltages, the new rated voltage of the capacitor (Vac) has to be considered.

#### 4. INTERPRETAÇÃO E LOCALIZAÇÃO DE ESQUEMAS

Para a utilização dos esquemas na própria fábrica, a sua localização é extremamente simples, já que para cada motor o número do esquema constará da Especificação Eletromecânica (ou desenho operacional).

Quando não for conhecido, de antemão, o seu número, este poderá ser determinado da seguinte maneira:

- a) A quantidade de ranhuras do estator compõe os dois primeiros algarismos;
- b) O número de pólos compõe os dois algarismos seguintes;
- c) O passo médio é indicado pelos próximos dois algarismos;
- d) O último algarismo, após a barra, é seqüencial, não tendo valor significativo, face à quantidade de combinações possíveis de tipos de bobinagem para um mesmo número de ranhuras, pólos e passo médio.

Serve, portanto, apenas para diferenciar um do outro, devendo-se escolher o tipo desejado pelo índice ou folheando-se os esquemas cujos números iniciais sejam idênticos.

- e) Esta escolha consiste na opção entre as alternativas abaixo:

**Trifásico:** O enrolamento é formado por três fases iguais distribuídas simetricamente e defasadas de 120° elétricos.

**Monofásico:** Formado por uma fase principal (bobina de força) e uma fase auxiliar (bobina de partida), defasadas de 90°.

**Concêntrico:** As bobinas de um mesmo grupo tem passos diferentes. São concêntricas (uma dentro da outra). As cabeças não se cruzam.

#### 4. ERKLÄRUNG UND LOKALISIERUNG DER SCHEMEN

Die Anwendung der Schemen in der eigenen Fabrik, wie auch ihre Lokalisierung ist sehr einfach, denn die Schemen-Nummer ist zufolge der elektromechanischen Bezeichnung (oder Betriebszeichnung) für jeden Motor bekannt.

Wenn diese Nummer vorher nicht bekannt war, kann sie auf folgende Art und Weise bestimmt werden:

- a) Die ersten beiden Zahlen geben die Anzahl der Nuten-Ständerzahl des Stators an.
- b) Die folgenden beiden Zahlen bezeichnen die Polzahl.
- c) Der Mittelschritt wird durch die darauf folgende Zahl festgelegt.
- d) Die letzte Zahl nach dem Querstrich ist laufend und ohne wichtige Bedeutung in bezug auf die Menge der möglichen Kombinationen von Wickeltypen für die gleiche Nutenzahl, Pole und Mittelschritt.

Deshalb muss man, um einen vom anderen zu unterscheiden, den gewünschten Typ durch das Verzeichnis oder die Schemenblätter, deren Anfangsnummern identisch sind, auswählen.

- e) Diese Auswahl kann durch folgende Alternativen getroffen werden:

**Dreiphasen:** Die Wicklung ist für drei Phasen bestimmt und symetrisch gleich verteilt, Phasenverschiebung um 120 elektrischer Grad.

**Einphasen:** Von einer Hauptphase (Kraftspule) und einer Hilfsphase (Anlaufspule) gebildet, Phasenverschiebung um 90 Grad.

**Konzentrisch:** Die Spulen derselben Gruppe haben verschiedene Schritte. Sie sind konzentriert (eine in der anderen). Die Wickelköpfe kreuzen sich nicht.

#### 4. INTERPRETATION AND SELECTION OF DIAGRAMS

It is very easy to determine the correct diagram at the factory, as the diagram number of each motor is indicated in the Electromechanical Specification (or working drawing).

When the diagram number is not previously known, it can be found as follows:

- a) The number of stator slots are indicated by the first two digits;
- b) The number of poles are indicated by the following two digits;
- c) The mean pitch is indicated by the next two digits;
- d) The last number, after the bar (/), is sequential. Due to the many possible combinations of types of winding for a given number of slots, poles, and mean pitch, this number is only used to differentiate one from the other. The required type must be selected from the index (Item 4.1) or looking at the diagrams with similar initial numbers.

- e) This selection consists of choosing between the following alternatives:

**Three-phase:** The winding is composed of three equal phases which are symmetrically distributed and out of phase by 120 electrical degrees.

**Single-phase:** It is composed of a Running Winding and a Starting Winding, both of which are out of phase by 90°.

**Concentric Winding:** The coils of the same group have different pitches. They are concentric (one inside the other). The coil ends do not cross over themselves.



**Imbricado:** As bobinas tem todas o mesmo passo. As cabeças se cruzam dentro de um mesmo grupo.

**Camada única:** Cada ranhura é ocupada por apenas um lado de bobina (ranhura cheia).

**Camada dupla:** Cada ranhura é preenchida por dois lados de bobina (meia ranhura).

**Série:** As bobinas de uma mesma fase são ligadas em série.

**N x paralelo:** As bobinas de uma mesma fase são ligadas N x em paralelo.

f) Cada esquema apresenta a configuração básica do enrolamento, seguida dos tipos de ligações possíveis, cada qual representado por uma letra, de A a F.

Assim, os esquemas trifásicos apresentam as ligações indicadas para 12, 9, 6 e 3 cabinhos, possibilitando a escolha do número de alternativas de tensões de trabalho.

Os trifásicos de dupla polaridade apresentam as três alternativas de ligação, todas para 6 cabinhos: conjugado constante, potência constante e conjugado variável.

Os monofásicos apresentam as ligações indicadas para 6, 4 e 2 cabinhos, possibilitando, além do número de alternativas de tensões de trabalho, também a escolha do sentido de rotação.

Exemplo de interpretação:

Esquema Número 72.06.10/2 D

72 – Estator com 72 ranhuras

06 – 6 pólos

10 – Passo médio 1:10

2 – Número seqüencial. Verificando o índice (ítem 4.1.) e o esquema encontramos: camada dupla, concêntrico, paralelo, passo 1: 7: 9: 11: 13.

D – Letra indicativa do Número de cabinhos (6) e possibilidade de ligação externa em triângulo ou estrela.

**Träufelwicklung:** Alle Spulen haben denselben Schritt. Die Wickelköpfe kreuzen sich in derselben Gruppe.

**Einzelschicht:** Jede Nut ist nur durch eine Seite der Spule besetzt (Vollnutwicklung).

**Doppelschicht:** Jede Nut ist durch zwei Seiten der Spule ausgefüllt (Halbnutwicklung).

**Serie:** Die Spulen derselben Phase sind in Serie geschaltet.

**N x parallel:** Die Spulen derselben Phase sind N x parallel geschaltet.

f) Jedes Schaltschema stellt die Grundbasis der Wicklung und die Folge der möglichen Schaltungen dar, jede mit einem Buchstaben von A bis F bezeichnet. Auf diese Art und Weise stellen die dreiphasigen Schaltschemen dar, die 12, 9, 6 und 3 Anschlusslitzen haben und somit eine Auswahl der Arbeitsspannung ermöglichen.

Die polumschaltbaren dreiphasigen stellen drei Schaltalternativen dar, alle für 6 Anschlusslitzen: Nennmoment konstant, konstante Leistung und Nennmoment verschieden.

Die Einphasen weisen Schaltungen für 6, 4 und 2 Anschlusslitzen auf, die ausser der Zahl von Alternativen der Arbeitsspannung auch die Wahl der Drehrichtung ermöglichen.

Beispiel als Erklärung

Schema Nummer 72.06.10/2 D

72 – Stator mit 72 Nuten

06 – 6 polig

10 – Mittelschritt 1:10

2 – Laufende Nummer. Inhaltsangabe (Punkt 4.1) und Schema prüfen: Doppelschicht, konzentrisch, parallel, Schritt 1: 7: 9: 11: 13.

D – Buchstabe der die Anschlusslitzen-Nummern (6) bezeichnet und die externe Schaltmöglichkeit in Stern/Dreieck.

**Lap Winding:** All coils have the same pitch. The coil ends cross over themselves in the same group.

**Single layer winding:** Each slot is filled by one coil side only (full slot packing).

**Two layer winding:** Each slot is filled by two coil sides (half slot packing).

**Series winding:** Coils of the same phase are series connected.

**N x parallel winding:** Coils of the same phase are N x parallel connected.

f) Each diagram shows the basic winding configuration, as well as possible types of connections, each type represented by a letter from A to F.

Therefore, the single-speed three-phase diagrams show connections for 12, 9, 6 and 3 leads, enabling selection of a number of alternative working voltages.

The two-speed three-phase diagrams show three alternative connections, all for 6 leads: constant torque, constant horse power, and variable torque.

Single-phase diagrams show connections for 6, 4 and 2 leads, enabling the direction of rotation to be selected in addition to the number of alternative working voltages.

Example of identification:

Diagram number 72.06.10/2 D

72 – Stator with 72 slots

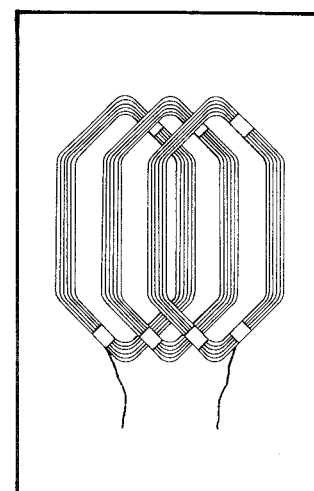
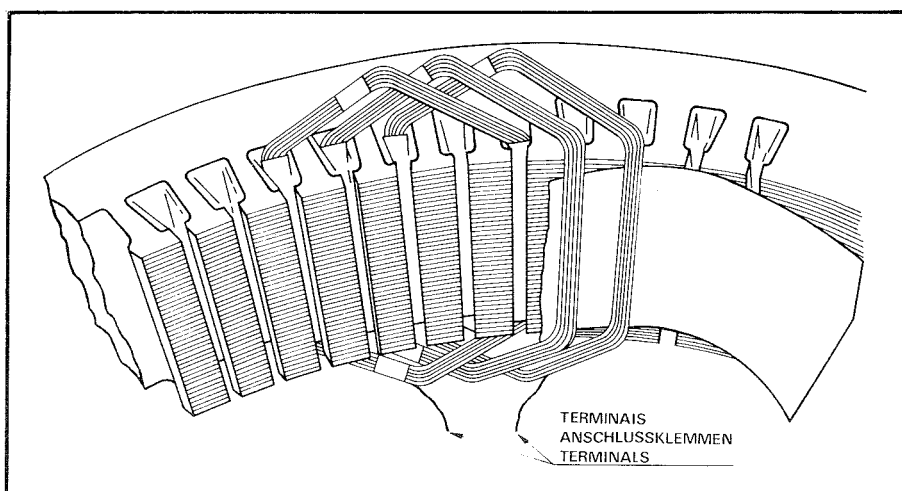
06 – 6 poles

10 – Mean pitch 1:10

2 – Sequential number. By checking the index (item 4.1) and the diagram we find that it is: a two layer winding, concentric, parallel, pitch 1: 7: 9: 11: 13.

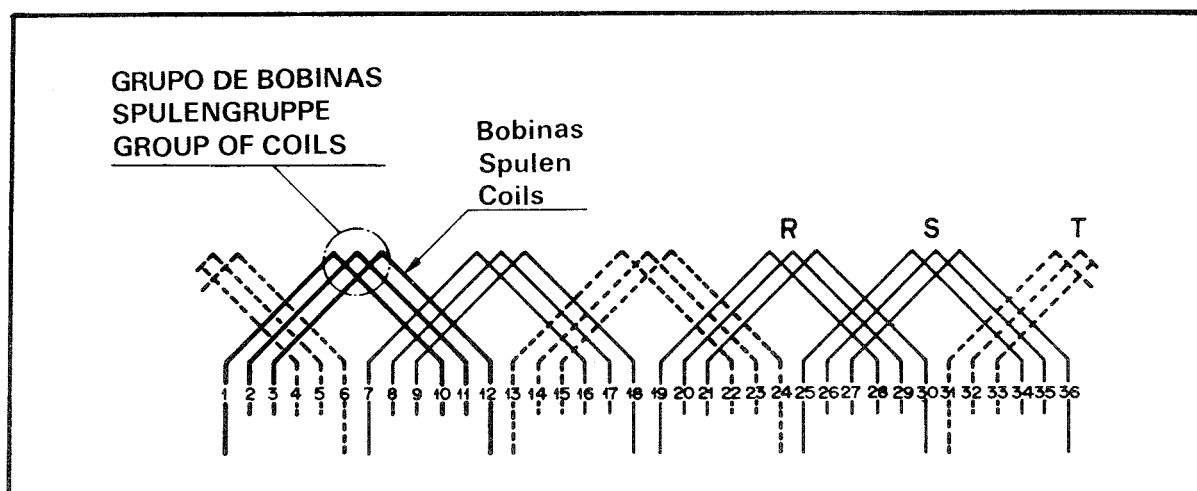
D – This is the letter that indicates the number of lead wires (6) and the possibility of external star or delta connection.

- g) As figuras abaixo permitem uma visualização de relação entre o aspecto real da bobinagem no estator com o respectivo esquema.
- g) Die nachstehenden Abbildungen geben eine Darstellung der Beziehung zwischen dem wirklichen Aspekt der Statorwicklung mit entsprechendem Schema.
- g) The sketches below show the relationship between the actual configuration of the winding in the stator and in the corresponding diagram.



- a) Aspecto do enrolamento no estator.
- a) Aspekt der Statorwicklung.
- a) Configuration of winding in the stator.

- b) Grupo de bobinas com enrolamento imbricado.
- b) Spulengruppe mit Träufelwicklung.
- b) Group of coils with lap winding.



- c) Esquema de bobinagem, motor trifásico, 36 ranhuras, 4 polos, enrolamentos imbricado, passo 1: 10 (R – S – T = fases).
- c) Wickelschema, Dreiphasenmotor, 36 Nuten, 4 polig, Träufelwicklung, Schritt 1: 10 (R – S – T = Phasen).
- c) Winding diagram, three-phase motor, 36 slots, 4 poles, lap winding, pitch 1: 10 (R – S – T = phases).

4.1. ÍNDICE – TRIFÁSICOS DE POLARIDADE ÚNICA

24 – 02 – 09 / 1	Camada Dupla	Imbricado Série
24 – 02 – 10 / 1	Camada Dupla	Imbricado Série
24 – 02 – 11 / 1	Camada Única	Imbricado Série
24 – 02 – 09 / 2	Camada Dupla	Concêntrico Série
24 – 02 – 10 / 2	Camada Dupla	Concêntrico Série
24 – 02 – 11 / 2	Camada Única	Concêntrico Série
24 – 04 – 06 / 1	Camada Dupla	Imbricado Série
24 – 04 – 07 / 1	Camada Única	Imbricado Série
24 – 04 – 06 / 2	Camada Dupla	Concêntrico Série
24 – 04 – 07 / 2	Camada Única	Concêntrico Série
24 – 08 – 04 / 1	Camada Única	Série
36 – 02 – 14 / 1	Camada Dupla	Imbricado Série
36 – 02 – 16 / 1	Camada Única	Imbricado Série

4.1 VERZEICHNIS – DREIPHASENMOTOREN EINZELPOLARITÄT

24 – 02 – 09 / 1	Doppelschicht	Träufelwicklung Serie
24 – 02 – 10 / 1	Doppelschicht	Träufelwicklung Serie
24 – 02 – 11 / 1	Einzelschicht	Träufelwicklung Serie
24 – 02 – 09 / 2	Doppelschicht	Konzentrische Serie
24 – 02 – 10 / 2	Doppelschicht	Konzentrische Serie
24 – 02 – 11 / 2	Einzelschicht	Konzentrische Serie
24 – 04 – 06 / 1	Doppelschicht	Träufelwicklung Serie
24 – 04 – 07 / 1	Einzelschicht	Träufelwicklung Serie
24 – 04 – 06 / 2	Doppelschicht	Konzentrische Serie
24 – 04 – 07 / 2	Einzelschicht	Konzentrische Serie
24 – 08 – 04 / 1	Einzelschicht	Serie
36 – 02 – 14 / 1	Doppelschicht	Träufelwicklung Serie
36 – 02 – 16 / 1	Einzelschicht	Träufelwicklung Serie

4.1 INDEX – SINGLE-SPEED THREE-PHASE DIAGRAMS

24 – 02 – 09 / 1	Two layer	Series-lap
24 – 02 – 10 / 1	Two layer	Series-lap
24 – 02 – 11 / 1	Single layer	Series-lap
24 – 02 – 09 / 2	Two layer	Series-concentric
24 – 02 – 10 / 2	Two layer	Series-concentric
24 – 02 – 11 / 2	Single layer	Series-concentric
24 – 04 – 06 / 1	Two layer	Series-lap
24 – 04 – 07 / 1	Single layer	Series-lap
24 – 04 – 06 / 2	Two layer	Series-concentric
24 – 04 – 07 / 2	Single layer	Series-concentric
24 – 08 – 04 / 1	Single layer	Series
36 – 02 – 14 / 1	Two layer	Series-lap
36 – 02 – 16 / 1	Single layer	Series-lap

36 – 02 – 14 / 2	Camada Dupla	Concêntrico Série
36 – 02 – 16 / 2	Camada Única	Concêntrico Série
36 – 02 – 14 / 3	Camada Dupla	Imbricado Paralelo
36 – 02 – 16 / 3	Camada Única	Imbricado Paralelo
36 – 02 – 14 / 4	Camada Dupla	Concêntrico Paralelo
36 – 02 – 16 / 4	Camada Única	Concêntrico Paralelo
36 – 04 – 08 / 1	Camada Dupla	Imbricado Série
36 – 04 – 10 / 1	Camada Única	Imbricado Série
36 – 04 – 08 / 2	Camada Dupla	Concêntrico Série
36 – 04 – 10 / 2	Camada Única	Concêntrico Série
36 – 04 – 08 / 3	Camada Dupla	Imbricado Paralelo
36 – 04 – 10 / 3	Camada Única	Imbricado Paralelo

36 – 02 – 14 / 2	Doppelschicht	Konzentrische Serie
36 – 02 – 16 / 2	Einzelschicht	Konzentrische Serie
36 – 02 – 14 / 3	Doppelschicht	Träufelwicklung Parallel
36 – 02 – 16 / 3	Einzelschicht	Träufelwicklung Parallel
36 – 02 – 14 / 4	Doppelschicht	Konzentrische Parallel
36 – 02 – 16 / 4	Einzelschicht	Konzentrische Parallel
36 – 04 – 08 / 1	Doppelschicht	Träufelwicklung Serie
36 – 04 – 10 / 1	Einzelschicht	Träufelwicklung Serie
36 – 04 – 08 / 2	Doppelschicht	Konzentrische Serie
36 – 04 – 10 / 2	Einzelschicht	Konzentrische Serie
36 – 04 – 08 / 3	Doppelschicht	Träufelwicklung Parallel
36 – 04 – 10 / 3	Einzelschicht	Träufelwicklung Parallel

36 – 02 – 14 / 2	Two layer	Series-concentric
36 – 02 – 16 / 2	Single layer	Series-concentric
36 – 02 – 14 / 3	Two layer	Parallel lap
36 – 02 – 16 / 3	Single layer	Parallel lap
36 – 02 – 14 / 4	Two layer	Parallel concentric
36 – 02 – 16 / 4	Single layer	Parallel concentric
36 – 04 – 08 / 1	Two layer	Series-lap
36 – 04 – 10 / 1	Single layer	Series-lap
36 – 04 – 08 / 2	Two layer	Series-concentric
36 – 04 – 10 / 2	Single layer	Series-concentric
36 – 04 – 08 / 3	Two layer	Parallel lap
36 – 04 – 10 / 3	Single layer	Parallel lap

36 - 04 - 08 / 4	Camada Dupla	Concêntrico Paralelo
36 - 04 - 10 / 4	Camada Única	Concêntrico Paralelo
36 - 04 - 08 / 5	Misto	Concêntrico Série
36 - 04 - 08 / 6	Misto	Concêntrico Série
36 - 06 - 06 / 1	Camada Dupla	Imbricado Série
36 - 06 - 07 / 1	Camada Dupla	Imbricado Série
36 - 06 - 07 / 2	Camada Única	Imbricado Série
36 - 06 - 06 / 2	Camada Dupla	Concêntrico Série
36 - 06 - 07 / 3	Camada Dupla	Concêntrico Série
36 - 06 - 07 / 4	Camada Única	Concêntrico Série
36 - 06 - 06 / 3	Camada Dupla	Imbricado Paralelo
36 - 06 - 07 / 5	Camada Dupla	Imbricado Paralelo
36 - 06 - 07 / 6	Camada Única	Imbricado Paralelo
36 - 06 - 06 / 4	Camada Dupla	Concêntrico Paralelo
36 - 06 - 07 / 7	Camada Dupla	Concêntrico Paralelo
36 - 06 - 07 / 8	Camada Única	Concêntrico 3 x Par.

36 - 04 - 08 / 4	Doppelschicht	Konzentrische Parallel
36 - 04 - 10 / 4	Einzelschicht	Konzentrische Parallel
36 - 04 - 08 / 5	Gemischt	Konzentrische Serie
36 - 04 - 08 / 6	Gemischt	Konzentrische Serie
36 - 06 - 06 / 1	Doppelschicht	Träufelwicklung Serie
36 - 06 - 07 / 1	Doppelschicht	Träufelwicklung Serie
36 - 06 - 07 / 2	Einzelschicht	Träufelwicklung Serie
36 - 06 - 06 / 2	Doppelschicht	Konzentrische Serie
36 - 06 - 07 / 3	Doppelschicht	Konzentrische Serie
36 - 06 - 07 / 4	Einzelschicht	Konzentrische Serie
36 - 06 - 06 / 3	Doppelschicht	Träufelwicklung Parallel
36 - 06 - 07 / 5	Doppelschicht	Träufelwicklung Parallel
36 - 06 - 07 / 6	Einzelschicht	Träufelwicklung Parallel
36 - 06 - 06 / 4	Doppelschicht	Konzentrische Parallel
36 - 06 - 07 / 7	Doppelschicht	Konzentrische Parallel
36 - 06 - 07 / 8	Einzelschicht	Konzentrische 3 x Parallel

36 - 04 - 08 / 4	Two layer	Parallel concentric
36 - 04 - 10 / 4	Single layer	Parallel concentric
36 - 04 - 08 / 5	Single and two layer	Series-concentric
36 - 04 - 08 / 6	Single and two layer	Series-concentric
36 - 06 - 06 / 1	Two layer	Series-lap
36 - 06 - 07 / 1	Two layer	Series-lap
36 - 06 - 07 / 2	Single layer	Series-lap
36 - 06 - 06 / 2	Two layer	Series-concentric
36 - 06 - 07 / 3	Two layer	Series-concentric
36 - 06 - 07 / 4	Single layer	Series-concentric
36 - 06 - 06 / 3	Two layer	Parallel lap
36 - 06 - 07 / 5	Two layer	Parallel lap
36 - 06 - 07 / 6	Single layer	Parallel lap
36 - 06 - 06 / 4	Two layer	Parallel concentric
36 - 06 - 07 / 7	Two layer	Parallel concentric
36 - 06 - 07 / 8	Single layer	Concentric 3x Parallel

36 – 06 – 06 / 5	Camada Única	Série
36 – 06 – 06 / 6	Camada Única	Paralelo
36 – 08 – 05 / 1	Camada Dupla	Imbricado Série
36 – 08 – 06 / 1	Camada Dupla	Imbricado Série
36 – 08 – 06 / 2	Camada Dupla	Concêntrico Série
36 – 08 – 05 / 3	Camada Dupla	Imbricado Paralelo
36 – 08 – 06 / 3	Camada Dupla	Imbricado Paralelo
36 – 08 – 05 / 4	Camada Dupla	Concêntrico Paralelo
36 – 08 – 06 / 4	Camada Dupla	Concêntrico Paralelo
36 – 08 – 05 / 5	Misto	Série
36 – 08 – 05 / 6	Camada Única	Concêntrico Série
36 – 08 – 05 / 7	Misto	Concêntrico Série
48 – 02 – 21 / 1	Camada Dupla	Concêntrico Série
48 – 02 – 21 / 2	Camada Dupla	Imbricado Série
48 – 02 – 18 / 4	Camada Dupla	Concêntrico Série
48 – 02 – 18 / 3	Camada Dupla	Imbricado Série

36 – 06 – 06 / 5	Einzelschicht	Serie
36 – 06 – 06 / 6	Einzelschicht	Parallel
36 – 08 – 05 / 1	Doppelschicht	Träufelwicklung Serie
36 – 08 – 06 / 1	Doppelschicht	Träufelwicklung Serie
36 – 08 – 06 / 2	Doppelschicht	Konzentrische Serie
36 – 08 – 05 / 3	Doppelschicht	Träufelwicklung Parallel
36 – 08 – 06 / 3	Doppelschicht	Träufelwicklung Parallel
36 – 08 – 05 / 4	Doppelschicht	Konzentrische Parallel
36 – 08 – 06 / 4	Doppelschicht	Konzentrische Parallel
36 – 08 – 05 / 5	Gemischt	Serie
36 – 08 – 05 / 6	Einzelschicht	Konzentrische Serie
36 – 08 – 05 / 7	Gemischt	Konzentrische Serie
48 – 02 – 21 / 1	Doppelschicht	Konzentrische Serie
48 – 02 – 21 / 2	Doppelschicht	Träufelwicklung Serie
48 – 02 – 18 / 4	Doppelschicht	Konzentrische Serie
48 – 02 – 18 / 3	Doppelschicht	Träufelwicklung Serie

36 – 06 – 06 / 5	Single layer	Series
36 – 06 – 06 / 6	Single layer	Parallel
36 – 08 – 05 / 1	Two layer	Series lap
36 – 08 – 06 / 1	Two layer	Series lap
36 – 08 – 06 / 2	Two layer	Series concentric
36 – 08 – 05 / 3	Two layer	Parallel lap
36 – 08 – 06 / 3	Two layer	Parallel lap
36 – 08 – 05 / 4	Two layer	Parallel concentric
36 – 08 – 06 / 4	Two layer	Parallel concentric
36 – 08 – 05 / 5	Single and two layer	Series
36 – 08 – 05 / 6	Single layer	Series concentric
36 – 08 – 05 / 7	Single and two layer	Series concentric
48 – 02 – 21 / 1	Two layer	Series concentric
48 – 02 – 21 / 2	Two layer	Series lap
48 – 02 – 18 / 4	Two layer	Series concentric
48 – 02 – 18 / 3	Two layer	Series lap

48 - 02 - 21 / 3	Camada Dupla	Concêntrico Paralelo
48 - 02 - 21 / 4	Camada Dupla	Imbricado Paralelo
48 - 02 - 18 / 1	Camada Dupla	Imbricado Paralelo
48 - 02 - 18 / 2	Camada Dupla	Concêntrico Paralelo
48 - 04 - 10 / 1	Camada Dupla	Concêntrico Série
48 - 04 - 11 / 1	Camada Dupla	Concêntrico Série
48 - 04 - 10 / 2	Camada Dupla	Concêntrico Paralelo
48 - 04 - 11 / 2	Camada Dupla	Concêntrico Paralelo
48 - 04 - 13 / 1	Camada Única	Imbricado Série
48 - 04 - 13 / 2	Camada Única	Concêntrico Paralelo
48 - 04 - 13 / 3	Camada Única	Concêntrico Série
48 - 06 - 07 / 1	Camada Dupla	Imbricado Série
48 - 06 - 09 / 2	Camada Única	Imbricado Série
48 - 08 - 06 / 1	Camada Dupla	Imbricado Série
48 - 08 - 06 / 2	Camada Dupla	Imbricado Paralelo
48 - 08 - 07 / 1	Camada Dupla	Imbricado Série

48 - 02 - 21 / 3	Doppelschicht	Konzentrische Parallel
48 - 02 - 21 / 4	Doppelschicht	Träufelwicklung Parallel
48 - 02 - 18 / 1	Doppelschicht	Träufelwicklung Parallel
48 - 02 - 18 / 2	Doppelschicht	Konzentrische Parallel
48 - 04 - 10 / 1	Doppelschicht	Konzentrische Serie
48 - 04 - 11 / 1	Doppelschicht	Konzentrische Serie
48 - 04 - 10 / 2	Doppelschicht	Konzentrische Parallel
48 - 04 - 11 / 2	Doppelschicht	Konzentrische Parallel
48 - 04 - 13 / 1	Einzelschicht	Träufelwicklung Serie
48 - 04 - 13 / 2	Einzelschicht	Konzentrische Parallel
48 - 04 - 13 / 3	Einzelschicht	Konzentrische Serie
48 - 06 - 07 / 1	Doppelschicht	Träufelwicklung Serie
48 - 06 - 09 / 2	Einzelschicht	Träufelwicklung Serie
48 - 08 - 06 / 1	Doppelschicht	Träufelwicklung Serie
48 - 08 - 06 / 2	Doppelschicht	Träufelwicklung Parallel
48 - 08 - 07 / 1	Doppelschicht	Träufelwicklung Serie

48 - 02 - 21 / 3	Two layer	Parallel concentric
48 - 02 - 21 / 4	Two layer	Parallel lap
48 - 02 - 18 / 1	Two layer	Parallel lap
48 - 02 - 18 / 2	Two layer	Parallel concentric
48 - 04 - 10 / 1	Two layer	Series concentric
48 - 04 - 11 / 1	Two layer	Series concentric
48 - 04 - 10 / 2	Two layer	Parallel concentric
48 - 04 - 11 / 2	Two layer	Parallel concentric
48 - 04 - 13 / 1	Single layer	Series lap
48 - 04 - 13 / 2	Single layer	Parallel concentric
48 - 04 - 13 / 3	Single layer	Series concentric
48 - 06 - 07 / 1	Two layer	Series lap
48 - 06 - 09 / 2	Single layer	Series lap
48 - 08 - 06 / 1	Two layer	Series lap
48 - 08 - 06 / 2	Two layer	Parallel lap
48 - 08 - 07 / 1	Two layer	Series lap

48 – 08 – 07 / 2	Camada Dupla	Imbricado Série
54 – 06 – 08 / 2	Camada Dupla	Concêntrico Paralelo
54 – 06 – 09 / 2	Camada Dupla	Concêntrico Paralelo
72 – 04 – 14 / 1	Camada Dupla	Concêntrico Paralelo
72 – 04 – 15 / 1	Camada Dupla	Concêntrico Paralelo
72 – 04 – 16 / 1	Camada Dupla	Concêntrico Paralelo
72 – 04 – 14 / 2	Camada Dupla	Concêntrico 4 x Par.
72 – 04 – 15 / 2	Camada Dupla	Concêntrico 4 x Par.
72 – 04 – 16 / 2	Camada Dupla	Concêntrico 4 x Par.
72 – 04 – 16 / 3	Camada Dupla	Concêntrico Série
72 – 04 – 15 / 3	Camada Dupla	Concêntrico Série
72 – 04 – 15 / 3	Camada Dupla	Concêntrico Série
72 – 06 – 10 / 1	Camada Dupla	Concêntrico Série
72 – 06 – 11 / 1	Camada Dupla	Concêntrico Série
72 – 06 – 12 / 1	Camada Dupla	Concêntrico Série

48 – 08 – 07 / 2	Doppelschicht	Träufelwicklung Serie
54 – 06 – 08 / 1	Doppelschicht	Konzentrische Serie
54 – 06 – 09 / 1	Doppelschicht	Konzentrische Serie
54 – 06 – 08 / 2	Doppelschicht	Konzentrische Parallel
54 – 06 – 09 / 2	Doppelschicht	Konzentrische Parallel
72 – 04 – 14 / 1	Doppelschicht	Konzentrische Parallel
72 – 04 – 15 / 1	Doppelschicht	Konzentrische Parallel
72 – 04 – 16 / 1	Doppelschicht	Konzentrische Parallel
72 – 04 – 14 / 2	Doppelschicht	Konzentrische 4 x Parallel
72 – 04 – 15 / 2	Doppelschicht	Konzentrische 4 x Parallel
72 – 04 – 16 / 2	Doppelschicht	Konzentrische 4 x Parallel
72 – 04 – 16 / 3	Doppelschicht	Konzentrische Serie
72 – 04 – 15 / 3	Doppelschicht	Konzentrische Serie
72 – 06 – 10 / 1	Doppelschicht	Konzentrische Serie
72 – 06 – 11 / 1	Doppelschicht	Konzentrische Serie
72 – 06 – 12 / 1	Doppelschicht	Konzentrische Serie

48 – 08 – 07 / 2	Two layer	Series lap
54 – 06 – 08 / 1	Two layer	Series concentric
54 – 06 – 09 / 1	Two layer	Series concentric
54 – 06 – 08 / 2	Two layer	Parallel concentric
54 – 06 – 09 / 2	Two layer	Parallel concentric
72 – 04 – 14 / 1	Two layer	Parallel concentric
72 – 04 – 15 / 1	Two layer	Parallel concentric
72 – 04 – 16 / 1	Two layer	Parallel concentric
72 – 04 – 14 / 2	Two layer	Concentric 4 x parallel
72 – 04 – 15 / 2	Two layer	Concentric 4 x parallel
72 – 04 – 16 / 2	Two layer	Concentric 4 x parallel
72 – 04 – 16 / 3	Two layer	Series concentric
72 – 04 – 15 / 3	Two layer	Series concentric
72 – 06 – 10 / 1	Two layer	Series concentric
72 – 06 – 11 / 1	Two layer	Series concentric
72 – 06 – 12 / 1	Two layer	Series concentric



72 - 06 - 10 / 2	Camada Dupla	Concêntrico Paralelo
72 - 06 - 11 / 2	Camada Dupla	Concêntrico Paralelo
72 - 06 - 12 / 2	Camada Dupla	Concêntrico Paralelo
72 - 06 - 10 / 3	Camada Dupla	Concêntrico 3 x Par.
72 - 06 - 11 / 3	Camada Dupla	Concêntrico 3 x Par.
72 - 06 - 10 / 4	Camada Dupla	Concêntrico 6 x Par.
72 - 06 - 11 / 4	Camada Dupla	Concêntrico 6 x Par.
72 - 06 - 10 / 5	Camada Dupla	Imbricado Paralelo
72 - 06 - 10 / 6	Camada Dupla	Imbricado Série
72 - 08 - 08 / 1	Camada Dupla	Concêntrico Série
72 - 08 - 08 / 2	Camada Dupla	Concêntrico Paralelo
72 - 08 - 08 / 3	Camada Dupla	Concêntrico 4 x Par.
72 - 08 - 08 / 4	Camada Dupla	Imbricado Série
72 - 08 - 08 / 5	Camada Dupla	Imbricado Paralelo
72 - 08 - 08 / 6	Camada Dupla	Imbricado 4 x Par.

72 - 06 - 10 / 2	Doppelschicht	Konzentrische Parallel
72 - 06 - 11 / 2	Doppelschicht	Konzentrische Parallel
72 - 06 - 12 / 2	Doppelschicht	Konzentrische Parallel
72 - 06 - 10 / 3	Doppelschicht	Konzentrische 3 x Parallel
72 - 06 - 11 / 3	Doppelschicht	Konzentrische 3 x Parallel
72 - 06 - 10 / 4	Doppelschicht	Konzentrische 6 x Parallel
72 - 06 - 11 / 4	Doppelschicht	Konzentrische 6 x Parallel
72 - 06 - 10 / 5	Doppelschicht	Träufelwicklung Parallel
72 - 06 - 10 / 6	Doppelschicht	Träufelwicklung Serie
72 - 08 - 08 / 1	Doppelschicht	Konzentrische Serie
72 - 08 - 08 / 2	Doppelschicht	Konzentrische Parallel
72 - 08 - 08 / 3	Doppelschicht	Konzentrische 4 x Parallel
72 - 08 - 08 / 4	Doppelschicht	Träufelwicklung Serie
72 - 08 - 08 / 5	Doppelschicht	Träufelwicklung Parallel
72 - 08 - 08 / 6	Doppelschicht	Träufelwicklung 4 x Parallel

72 - 06 - 10 / 2	Two layer	Parallel concentric
72 - 06 - 11 / 2	Two layer	Parallel concentric
72 - 06 - 12 / 2	Two layer	Parallel concentric
72 - 06 - 10 / 3	Two layer	Concentric 3 x parallel
72 - 06 - 11 / 3	Two layer	Concentric 3 x parallel
72 - 06 - 10 / 4	Two layer	Concentric 6 x parallel
72 - 06 - 11 / 4	Two layer	Concentric 6 x parallel
72 - 06 - 10 / 5	Two layer	Parallel lap
72 - 06 - 10 / 6	Two layer	Series lap
72 - 08 - 08 / 1	Two layer	Series concentric
72 - 08 - 08 / 2	Two layer	Parallel concentric
72 - 08 - 08 / 3	Two layer	Concentric 4 x parallel
72 - 08 - 08 / 4	Two layer	Series lap
72 - 08 - 08 / 5	Two layer	Parallel lap
72 - 08 - 08 / 6	Two layer	Lap 4 x parallel

#### 4.2. ÍNDICE – TRIFÁSICOS DE DUPLA POLARIDADE

24 – 42 – 07 / 1	Camada Dupla	Imbricado Série
24 – 42 – 07 / 2	Camada Dupla	Concêntrico Série
24 – 84 – 04 / 1	Camada Única	Série
36 – 42 – 10 / 1	Camada Dupla	Imbricado Série
36 – 42 – 10 / 2	Camada Dupla	Concêntrico Série
36 – 84 – 05 / 1	Camada Dupla	Imbricado Série
36 – 84 – 06 / 1	Camada Dupla	Imbricado Série
36 – 84 – 05 / 2	Camada Dupla	Concêntrico Série
36 – 84 – 06 / 2	Camada Dupla	Concêntrico Série
48 – 42 – 13 / 1	Camada Dupla	Imbricado Série
48 – 42 – 13 / 2	Camada Dupla	Concêntrico Série
48 – 84 – 07 / 1	Camada Dupla	Imbricado Série
48 – 84 – 06 / 1	Camada Dupla	Imbricado Série

#### 4.2 VERZEICHNIS – DREIPHASENMOTOREN POLUMSCHALTBAR

24 – 42 – 07 / 1	Doppelschicht	Träufelwicklung Serie
24 – 42 – 07 / 2	Doppelschicht	Konzentrische Serie
24 – 84 – 04 / 1	Einzelschicht	Serie
36 – 42 – 10 / 1	Doppelschicht	Träufelwicklung Serie
36 – 42 – 10 / 2	Doppelschicht	Konzentrische Serie
36 – 84 – 05 / 1	Doppelschicht	Träufelwicklung Serie
36 – 84 – 06 / 1	Doppelschicht	Träufelwicklung Serie
36 – 84 – 05 / 2	Doppelschicht	Konzentrische Serie
36 – 84 – 06 / 2	Doppelschicht	Konzentrische Serie
48 – 42 – 13 / 1	Doppelschicht	Träufelwicklung Serie
48 – 42 – 13 / 2	Doppelschicht	Konzentrische Serie
48 – 84 – 07 / 1	Doppelschicht	Träufelwicklung Serie
48 – 84 – 06 / 1	Doppelschicht	Träufelwicklung Serie

#### 4.2 INDEX – TWO-SPEED THREE-PHASE DIAGRAMS

24 – 42 – 07 / 1	Two layer	Series lap
24 – 42 – 07 / 2	Two layer	Series concentric
24 – 84 – 04 / 1	Single layer	Series
36 – 42 – 10 / 1	Two layer	Series lap
36 – 42 – 10 / 2	Two layer	Series concentric
36 – 84 – 05 / 1	Two layer	Series lap
36 – 84 – 06 / 1	Two layer	Series lap
36 – 84 – 05 / 2	Two layer	Series concentric
36 – 84 – 06 / 2	Two layer	Series concentric
48 – 42 – 13 / 1	Two layer	Series lap
48 – 42 – 13 / 2	Two layer	Series concentric
48 – 84 – 07 / 1	Two layer	Series lap
48 – 84 – 06 / 1	Two layer	Series lap

72 – 84 – 10 / 1	Camada Dupla	Imbricado Série
72 – 84 – 10 / 2	Camada Dupla	Concêntrico Série
72 – 42 – 19 / 1	Camada Dupla	Concêntrico Série
72 – 26 – 07 / 1	Camada Dupla	Imbricado Série
72 – 26 – 07 / 2	Camada Dupla	Concêntrico Série

#### 4.3. ÍNDICE – MONOFÁSICOS

24 – 02 – 09 / 1	Camada Única	Série
24 – 02 – 08 / 1	Camada Dupla	Série
24 – 02 – 09 / 2	Camada Dupla	Série
32 – 04 – 06 / 1	Camada Única	Série
32 – 04 – 06 / 2	Camada Dupla	Série

72 – 84 – 10 / 1	Doppelschicht	Träufelwicklung Serie
72 – 84 – 10 / 2	Doppelschicht	Konzentrische Serie
72 – 42 – 19 / 1	Doppelschicht	Konzentrische Serie
72 – 26 – 07 / 1	Doppelschicht	Träufelwicklung Serie
72 – 26 – 07 / 2	Doppelschicht	Konzentrische Serie

#### 4.3 VERZEICHNIS – EINPHASENMOTOREN

24 – 02 – 09 / 1	Single layer	Series
24 – 02 – 08 / 1	Two layer	Series
24 – 02 – 09 / 2	Two layer	Series
32 – 04 – 06 / 1	Single layer	Series
32 – 04 – 06 / 2	Two layer	Series

72 – 84 – 10 / 1	Two layer	Series lap
72 – 84 – 10 / 2	Two layer	Series concentric
72 – 42 – 19 / 1	Two layer	Series concentric
72 – 26 – 07 / 1	Two layer	Series lap
72 – 26 – 07 / 2	Two layer	Series concentric

#### 4.3 INDEX – SINGLE-PHASE DIAGRAMS

24 – 02 – 09 / 1	Einzelschicht	Serie
24 – 02 – 08 / 1	Doppelschicht	Serie
24 – 02 – 09 / 2	Doppelschicht	Serie
32 – 04 – 06 / 1	Einzelschicht	Serie
32 – 04 – 06 / 2	Doppelschicht	Serie

32 – 04 – 06 / 3	Camada Única	Paralelo
32 – 04 – 06 / 4	Camada Única	Série
36 – 04 – 07 / 1	Camada Única	Série
36 – 04 – 07 / 2	Camada Dupla	Série
36 – 04 – 06 / 1	Camada Dupla	Série
36 – 04 – 06 / 3	Camada Única	Série
36 – 04 – 07 / 3	Camada Dupla	Paralelo
36 – 04 – 06 / 2	Camada Dupla	Paralelo
48 – 04 – 08 / 1	Camada Dupla	Série
48 – 04 – 08 / 2	Camada Dupla	Paralelo
48 – 04 – 08 / 4	Camada Única	Paralelo
48 – 04 – 08 / 5	Camada Única	Série

32 – 04 – 06 / 3	Einzelschicht	Parallel
32 – 04 – 06 / 4	Einzelschicht	Serie
36 – 04 – 07 / 1	Einzelschicht	Serie
36 – 04 – 07 / 2	Doppelschicht	Serie
36 – 04 – 06 / 1	Doppelschicht	Serie
36 – 04 – 06 / 3	Einzelchicht	Serie
36 – 04 – 07 / 3	Doppelschicht	Parallel
36 – 04 – 06 / 2	Doppelschicht	Parallel
48 – 04 – 08 / 1	Doppelschicht	Serie
48 – 04 – 08 / 2	Doppelschicht	Parallel
48 – 04 – 08 / 4	Einzelschicht	Parallel
48 – 04 – 08 / 5	Einzelschicht	Serie

32 – 04 – 06 / 3	Single layer	Parallel
32 – 04 – 06 / 4	Single layer	Series
36 – 04 – 07 / 1	Single layer	Series
36 – 04 – 07 / 2	Two layer	Series
36 – 04 – 06 / 1	Two layer	Series
36 – 04 – 06 / 3	Single layer	Series
36 – 04 – 07 / 3	Two layer	Parallel
36 – 04 – 06 / 2	Two layer	Parallel
48 – 04 – 08 / 1	Two layer	Series
48 – 04 – 08 / 2	Two layer	Parallel
48 – 04 – 08 / 4	Single layer	Parallel
48 – 04 – 08 / 5	Single layer	Series

DIMENSÕES DE FIOS DE COBRE  
 NUS E ESMALTADOS

 MASSE DER BLANKEN UND  
 EMAILLIERTEN KUPFERDRÄHTE

 BARE AND ENAMEL-COVERED  
 COPPER WIRE DIMENSIONS

FIO NU				FIO ESMALTADO			Bitola AWG Equivalente	Fio Nu $\phi$ Nominal
$\phi$ Nominal	Seção	$\phi$ Mínimo	$\phi$ Máximo	$\phi$ Nominal	$\phi$ Mínimo	$\phi$ Máximo		
<b>BLANKER DRAHT</b>				<b>EMAILLIERTER DRAHT</b>			Drahtstarke Equivalent AWG	Blanker Draht $\phi$ Nominal
$\phi$ Nominal	Querschnitt	$\phi$ Kleinster	$\phi$ Grosster	$\phi$ Nominal	$\phi$ Kleinster	$\phi$ Grosster		
<b>BARE WIRE</b>				<b>ENAMEL-COVERED WIRE</b>			Gauge AWG	Bare Wire $\phi$ Nominal
$\phi$ Nominal	Cross-section	$\phi$ Minimum	$\phi$ Maximum	$\phi$ Nominal	$\phi$ Minimum	$\phi$ Maximum		
0,140	0,015	0,137	0,143	0,17	0,16	0,18	35	0,140
0,160	0,020	0,157	0,163	0,19	0,18	0,20	34	0,160
0,180	0,025	0,177	0,183	0,21	0,20	0,22	33	0,180
0,200	0,031	0,197	0,203	0,24	0,23	0,25	32	0,200
0,224	0,039	0,221	0,227	0,26	0,25	0,27	31	0,224
0,250	0,049	0,246	0,254	0,29	0,28	0,30	30	0,250
0,280	0,062	0,276	0,284	0,32	0,31	0,33	29	0,280
0,315	0,078	0,311	0,319	0,36	0,35	0,37	28	0,315
0,355	0,099	0,351	0,359	0,40	0,39	0,41	27	0,355
0,400	0,126	0,395	0,405	0,45	0,44	0,46	26	0,400
0,450	0,159	0,445	0,455	0,51	0,50	0,52	25	0,450
0,500	0,196	0,495	0,505	0,56	0,55	0,57	24	0,500
0,560	0,246	0,550	0,570	0,62	0,61	0,63	23	0,560
0,630	0,312	0,620	0,640	0,70	0,69	0,71	22	0,630
0,710	0,396	0,700	0,720	0,78	0,77	0,79	21	0,710
0,750	0,442	0,740	0,760	0,82	0,81	0,83	—	0,750
0,800	0,503	0,790	0,810	0,87	0,85	0,89	20	0,800
0,850	0,567	0,840	0,860	0,92	0,90	0,94	—	0,850
0,900	0,636	0,890	0,910	0,97	0,95	0,99	19	0,900
0,950	0,709	0,940	0,960	1,02	1,00	1,04	—	0,950
1,00	0,785	0,99	1,01	1,07	1,05	1,09	18	1,00
1,06	0,882	1,05	1,07	1,14	1,12	1,16	—	1,06
1,12	0,985	1,11	1,13	1,20	1,18	1,22	—	1,12
1,18	1,094	1,17	1,19	1,26	1,24	1,28	17	1,18
1,25	1,227	1,24	1,26	1,33	1,31	1,35	—	1,25
1,32	1,368	1,31	1,33	1,40	1,38	1,42	16	1,32
1,40	1,539	1,39	1,41	1,49	1,47	1,51	15	1,40
1,50	1,767	1,48	1,52	1,59	1,57	1,61	—	1,50
1,60	2,011	1,58	1,62	1,69	1,67	1,71	14	1,60
1,70	2,270	1,68	1,72	1,79	1,77	1,81	—	1,70
1,80	2,545	1,78	1,82	1,90	1,88	1,92	13	1,80
1,90	2,835	1,88	1,92	2,00	1,98	2,02	—	1,90
2,00	3,142	1,98	2,02	2,10	2,08	2,12	12	2,00
2,12	3,530	2,10	2,14	2,22	2,20	2,24	—	2,12
2,24	3,941	2,22	2,26	2,35	2,33	2,37	—	2,24
2,36	4,374	2,34	2,38	2,47	2,45	2,49	11	2,36
2,50	4,909	2,48	2,53	2,61	2,59	2,63	—	2,50
2,65	5,515	2,62	2,68	2,76	2,74	2,78	—	2,65

**OBS:**

- Diâmetros em mm.
- Seção em mm<sup>2</sup>.

**ANMERKUNG:**

- Durchmesser in mm.
- Querschnitt in qmm.

**NOTE:**

- Diameter in mm.
- Cross-section in mm<sup>2</sup>.

TABELA DE DADOS TÉCNICOS PARA ESCOLHER OU MODIFICAR O PASSO DO ENROLAMENTO  
TABELLE TECHNISCHER DATEN, UM DEN WICKELSCHRITT ZU WÄHLEN ODER ZU ÄNDERN  
TECHNICAL DATA TABLE TO SELECT OR MODIFY THE WINDING PITCH

Nº Ranhuras Estator Nutenzahl Stator Number of Stator Slots				p	Z	ξ	p	Z	ξ	p	Z	ξ
2 pólos 2 polig 2 poles	4 pólos 4 polig 4 poles	6 pólos 6 polig 6 poles	8 pólos 8 polig 8 poles									
12	24	36	48	1: 7 1: 4	0 % 41,2 %	0,966 0,684	1: 6	3,6 %	0,934	1: 5	15,4 %	0,837
18	36	54	72	1: 10 1: 7	0 % 15,2 %	0,96 0,832	1: 9 1: 6	1,5 % 30,8 %	0,945 0,735	1: 8	6,4 %	0,902
24	48	72	96	1: 13 1: 10 1: 7	0 % 8,2 % 41,0 %	0,958 0,885 0,678	1: 12 1: 9	1,2 % 15,4 %	0,946 0,83	1: 11 1: 8	3,6 % 26,0 %	0,926 0,76
30	60	90		1: 16 1: 13 1: 10	0 % 5,1 % 23,7 %	0,957 0,91 0,774	1: 15 1: 12 1: 9	1 % 9,5 % 35 %	0,947 0,874 0,71	1: 14 1: 11	2,3 % 15,2 %	0,935 0,829
36	72			1: 19 1: 16 1: 13	0 % 3,5 % 15,2 %	0,956 0,923 0,829	1: 18 1: 15 1: 12	0,8 % 6,3 % 22 %	0,948 0,898 0,783	1: 17 1: 14 1: 11	1,5 % 10,2 % 30,8 %	0,942 0,866 0,732
48	96			1: 25 1: 22 1: 19 1: 16	0 % 1,9 % 8,2 % 20,2 %	0,955 0,937 0,881 0,794	1: 24 1: 21 1: 18 1: 15	0,8 % 3,3 % 11,4 % 26,0 %	0,948 0,923 0,856 0,757	1: 23 1: 20 1: 17 1: 14	1,2 % 6,0 % 15,2 % 33,1 %	0,944 0,902 0,827 0,716

p = Passo médio do enrolamento  
Z = % de espiras a mais por passo do enrolamento encurtado  
ξ = Fator de enrolamento

Exemplo: Se encurtarmos o passo de enrolamento de um motor de 36 ranhuras, 4 pólos de 1: 10 para passo 1: 8, deveremos aumentar as espiras de 6,4%.

p = Mittelschritt  
Z = % der Mehrwindungen pro Wickelschritt verkürzt  
ξ = Wicklungsfaktor

Beispiel: Wenn wir den Wickelschritt eines Motors mit 36 Nuten, 4 polig, mit Schritt 1: 10 auf 1: 8 kürzen, müssen wir die Windungen um 6,4% erhöhen.

p = Medium winding pitch  
Z = % of overruns per reduced winding pitch  
ξ = Winding factor

Example: If we reduce the winding pitch of a motor with 36 slots, 4 poles, from 1: 10 to Pitch 1: 8 we must increase turns by 6,4%.

TABELA COMPARATIVA DE BITOLAS DE FIOS – Sistema Métrico – Sistema AWG  
TABELLE FÜR DEN VERGLEICH DER DRAHTSTÄRKEN – TBG-0113.10 – Metrisches System – AWG System  
"COMPARISON CHART OF WIRE DIAMETERS" – Metric System – AWG System

**OBJETIVO**

Esta Norma apresenta uma tabela parcial de equivalência entre bitolas do Sistema Métrico e do Sistema AWG, bem como o percentual de variação de área da seção transversal de fios do Sistema Métrico em relação à correspondente do Sistema AWG.

**ZWECK DIESER TABELLE**

Diese Norm stellt eine Teiltabelle dar, zum Vergleich der Drahtstärken des Metrischen – und AWG Systems, ausserdem wird auch die prozentuale Veränderung der Fläche des Querprofils der Drähte des Metrischen Systems im Verhältnis zum AWG System angegeben.

**PURPOSE**

This chart shows the nearest equivalent diameters between the metric system and the AWG system, as well as the percentage variation in area of cross-section of wires between the Metric System and the corresponding AWG system.

Sistema Métrico Diâmetro (mm)	Sistema AWG		Áreas (mm <sup>2</sup> )		Variação % de Área (AWG = 100%)
	Nº	Diâmetro (mm)	Sistema Métrico	Sistema AWG	
0,160	34	0,160	0,02011	0,02011*	0
0,180	33	0,180	0,02545	0,02545	0
0,200	32	0,203	0,03142	0,03237	- 3,02
0,224	31	0,226	0,03941	0,04012	- 1,80
0,250	30	0,254	0,04909	0,05067	- 3,22
0,280	29	0,287	0,06158	0,06469	- 5,05
0,315	28	0,320	0,07793	0,08043	- 3,21
0,355	27	0,361	0,09898	0,10235	- 3,40
0,400	26	0,404	0,12566	0,12819	- 2,01
0,450	25	0,455	0,15904	0,16260	- 2,24
0,500	24	0,511	0,19635	0,20508	- 4,45
0,560	23	0,574	0,24630	0,25877	- 5,06
0,630	22	0,643	0,31173	0,32472	- 4,17
0,710	21	0,724	0,39592	0,41169	- 3,98
0,750	-	-	0,44179	-	-
0,800	20	0,813	0,50266	0,51912	- 3,27
0,850	-	-	0,56745	-	-
0,900	19	0,912	0,63617	0,65325	- 3,68
0,950	-	-	0,70882	-	-
1,000	18	1,024	0,78540	0,82355	- 4,86
1,060	-	-	0,88247	-	-
1,120	-	-	0,98520	-	-
1,180	17	1,151	1,09359	1,04050	+ 4,85
1,250	-	-	1,22719	-	-
1,320	16	1,290	1,36848	1,30698	+ 4,49
1,400	15	1,450	1,53938	1,65130	- 7,27
1,500	-	-	1,76715	-	-
1,600	14	1,628	2,01062	2,08161	- 3,53
1,700	-	-	2,26980	-	-
1,800	13	1,829	2,54469	2,62735	- 3,25
1,900	-	-	2,83529	-	-
2,000	12	2,052	3,14159	3,30708	- 3,27
2,120	-	-	3,52989	-	-
2,240	-	-	3,94081	-	-

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ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

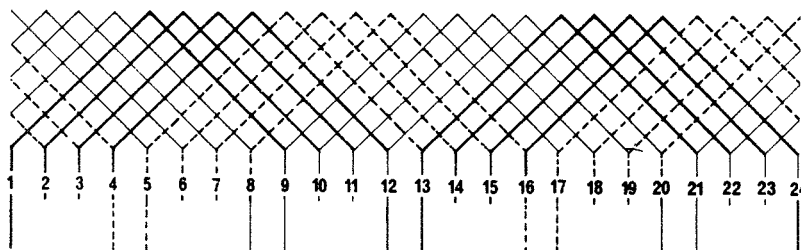
24 RANHURAS  
24 NUTEN  
24 SLOTS

2 POLOS  
2 POLE  
2 POLES

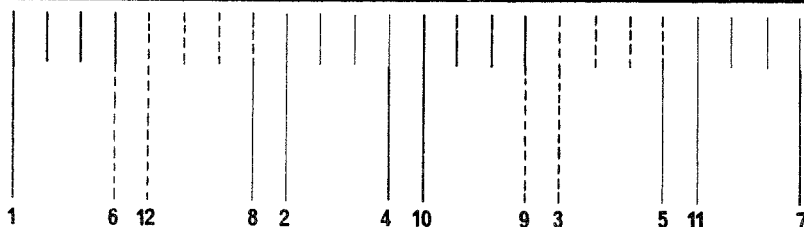
CAMADA DUPLA  
DOPPEL SCHICHT  
TWO LAYER

IMBRICADO SÉRIE  
TRAUFEL-WICKLUNG SERIE  
SERIES LAP

PASSO 1:9  
WICKEL-SCHRITT 1:9  
PITCH 1:9

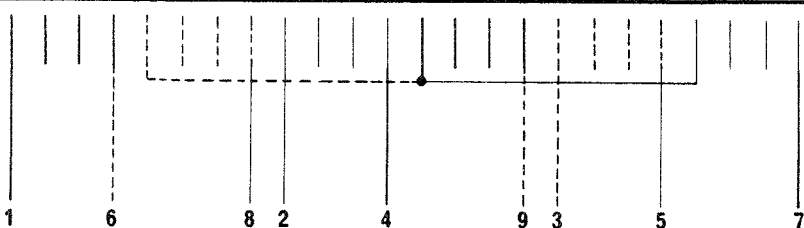


$\Delta/Y$   
12 Cabos  
12 Kabel  
12 Leads



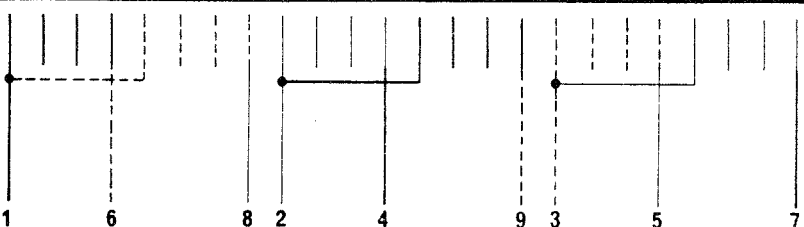
**A**

$Y/Y$   
9 Cabos  
9 Kabel  
9 Leads



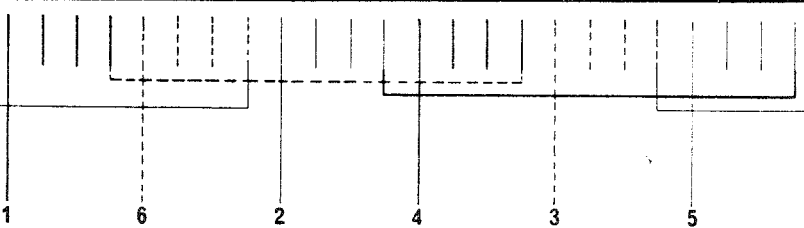
**B**

$\Delta/\Delta$   
9 Cabos  
9 Kabel  
9 Leads



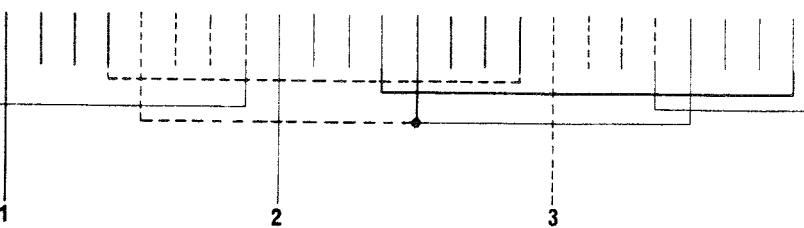
**C**

$\Delta/Y$   
6 Cabos  
6 Kabel  
6 Leads



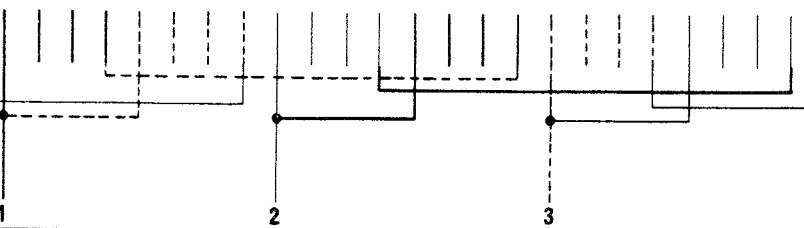
**D**

$Y$   
3 Cabos  
3 Kabel  
3 Leads



**E**

$\Delta$   
3 Cabos  
3 Kabel  
3 Leads



**F**

\*Nova nomenclatura

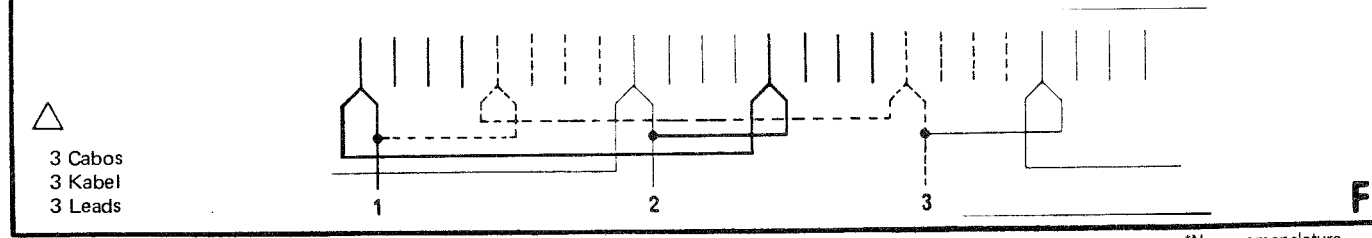
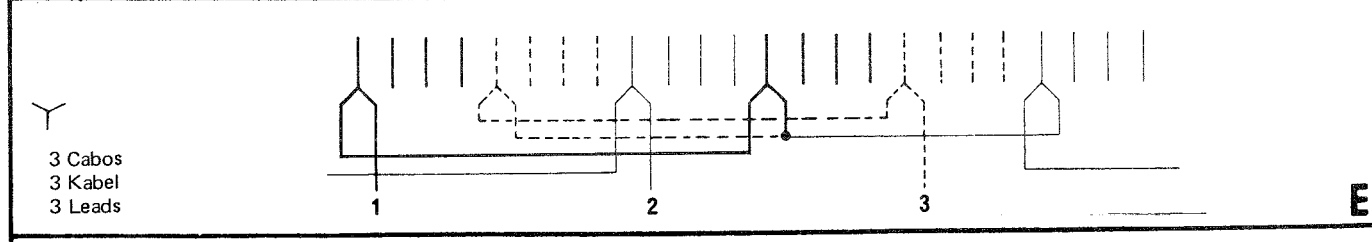
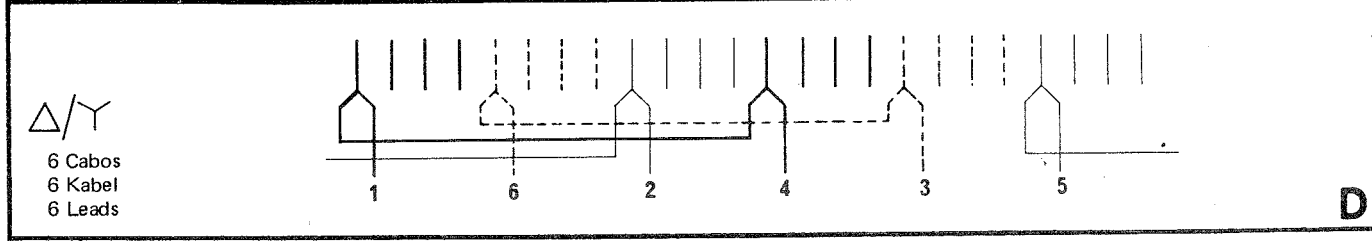
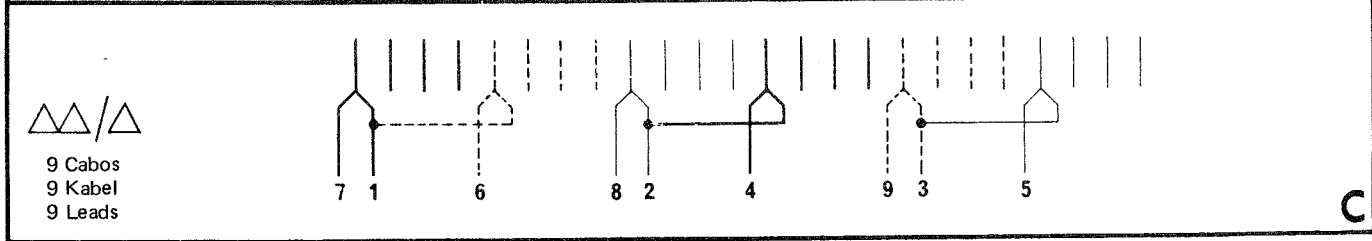
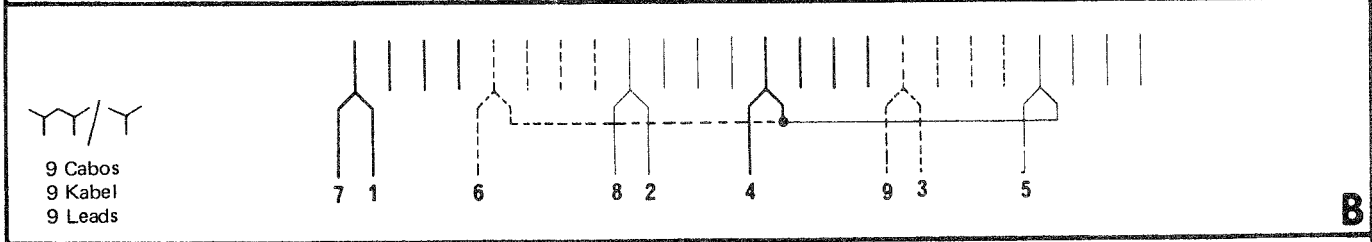
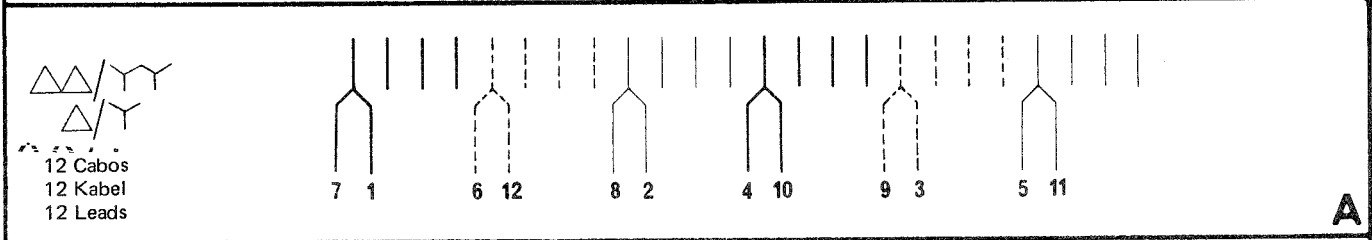
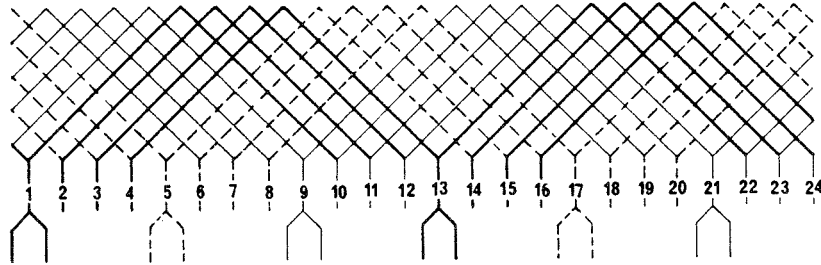




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

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(24-002-10/122-N)\*

TRIFÁSICO	24 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:10
DREHSTROM	24 NUTEN	2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:10
THREE-PHASE	24 SLOTS	2 POLES	TWO LAYER	SERIES LAP	PITCH 1:10



24 - 02 - 11/1  
(24-002-11/112-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

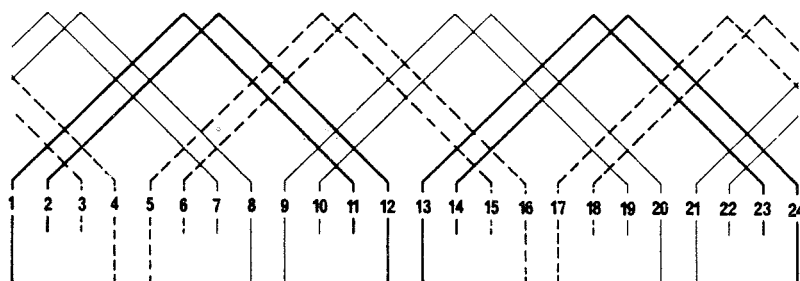
24 RANHURAS  
24 NUTEN  
24 SLOTS

2 POLOS  
2 POLE  
2 POLES

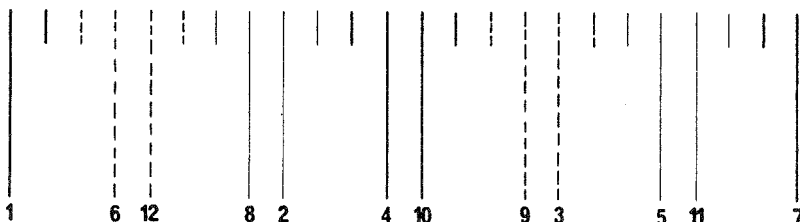
CAMADA ÚNICA  
EINZEL-SCHICHT  
SINGLE LAYER

IMBRICADO SÉRIE  
TRAUFEL-WICKLUNG SÉRIE  
SERIES LAP

PASSO 1:11  
WICKEL-SCHRITT 1:11  
PITCH 1:11

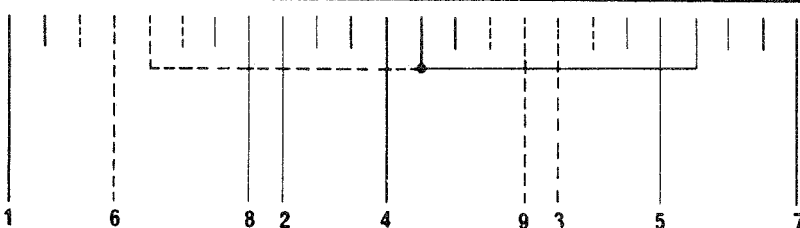


$\Delta/Y$   
12 Cabos  
12 Kabel  
12 Leads



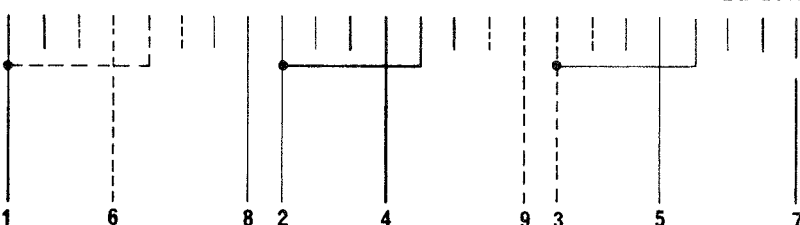
**A**

$Y/Y$   
9 Cabos  
9 Kabel  
9 Leads



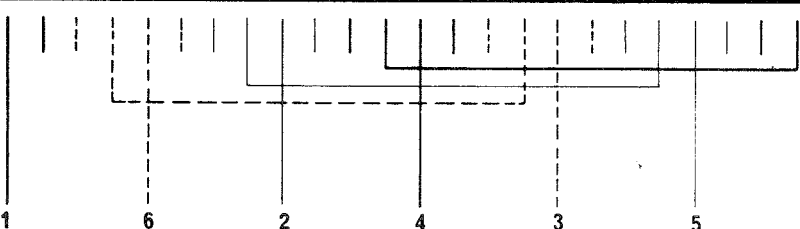
**B**

$\Delta/\Delta$   
9 Cabos  
9 Kabel  
9 Leads



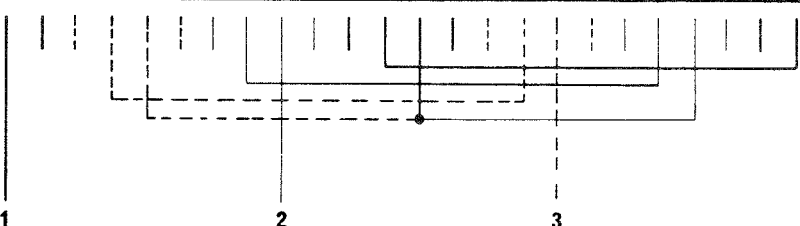
**C**

$\Delta/Y$   
6 Cabos  
6 Kabel  
6 Leads



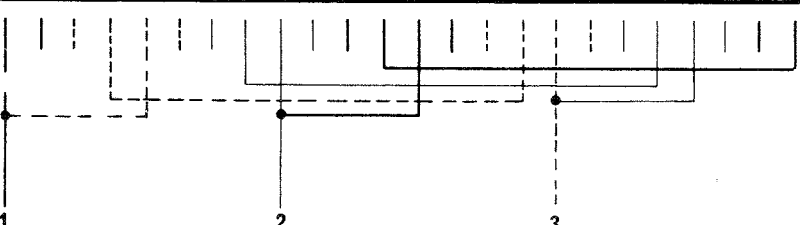
**D**

$Y/Y$   
3 Cabos  
3 Kabel  
3 Leads



**E**

$\Delta/\Delta$   
3 Cabos  
3 Kabel  
3 Leads



**F**

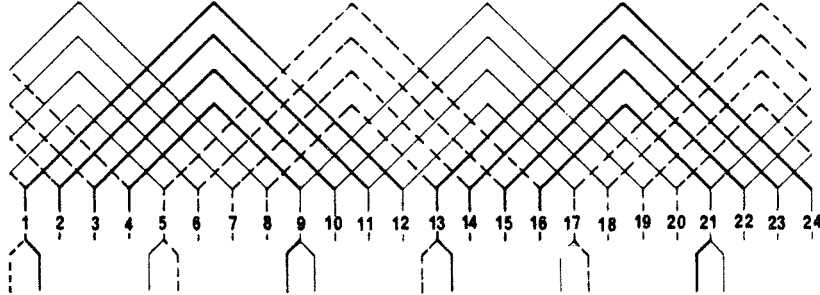
\*Nova nomenclatura




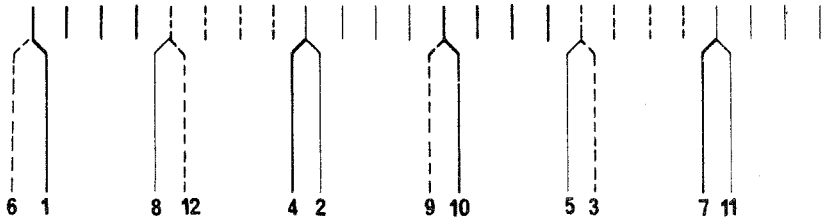
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

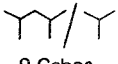
24 - 02 - 09/2  
(24-002-09/121-N)\*

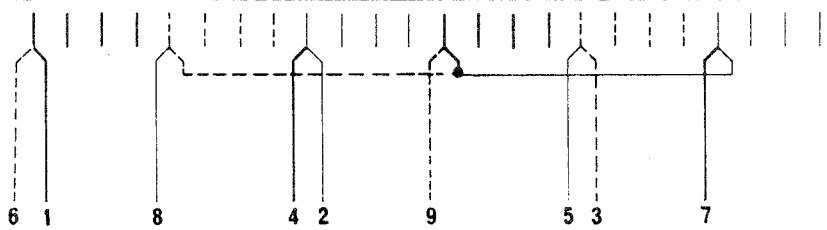
TRIFÁSICO	24 RANHURAS	2 POLOS	CAMADA DUPLA	CONCENTRICO SÉRIE	PASSO 1:6:8:10:12
DREHSTROM	24 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:6:8:10:12
THREE-PHASE	24 SLOTS	2 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:6:8:10:12



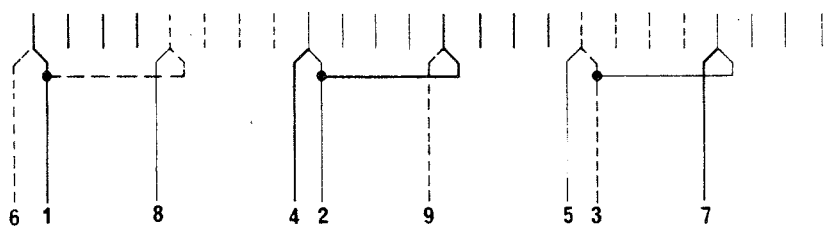
  
12 Cabos  
12 Kabel  
12 Leads




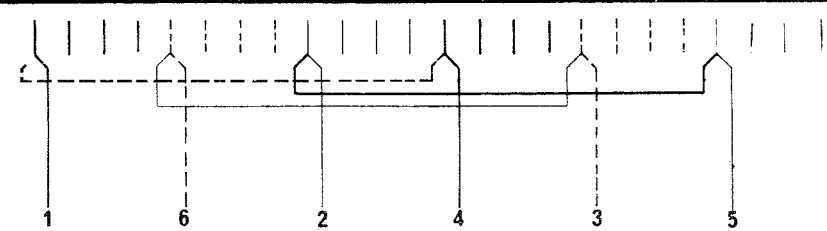
  
9 Cabos  
9 Kabel  
9 Leads




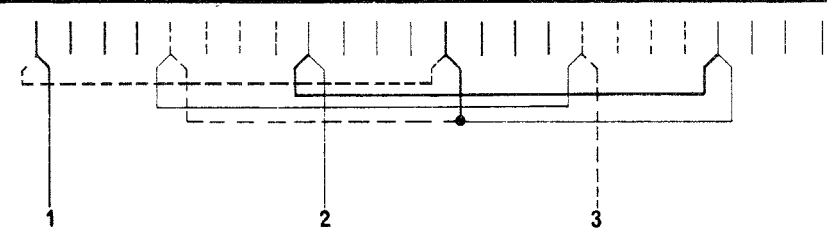
  
9 Cabos  
9 Kabel  
9 Leads




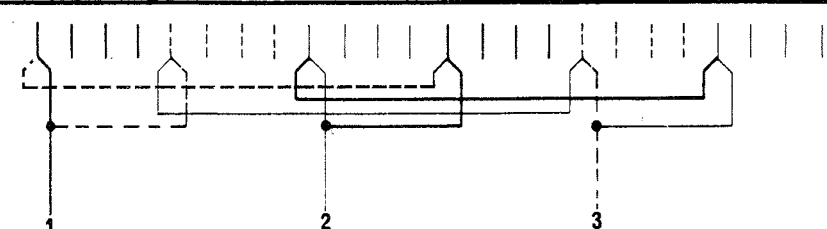
  
6 Cabos  
6 Kabel  
6 Leads



  
3 Cabos  
3 Kabel  
3 Leads



  
3 Cabos  
3 Kabel  
3 Leads

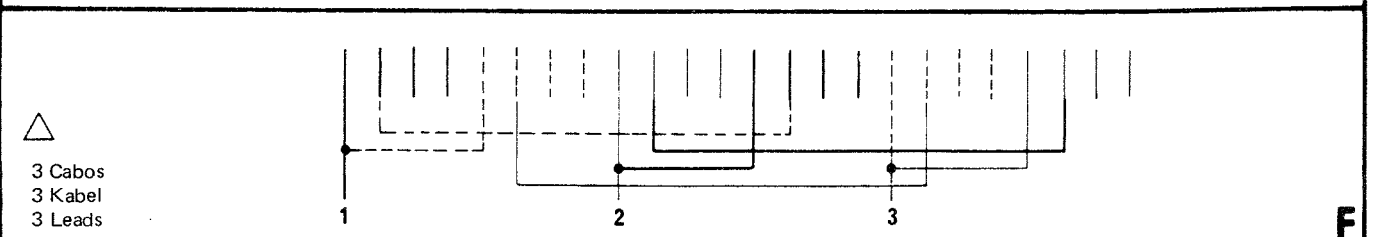
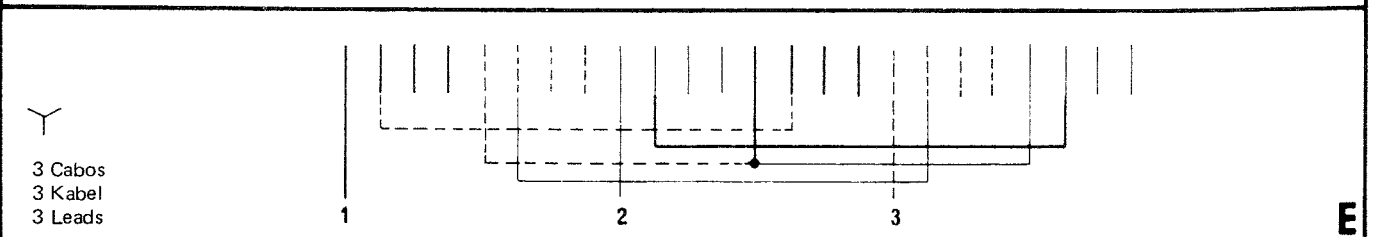
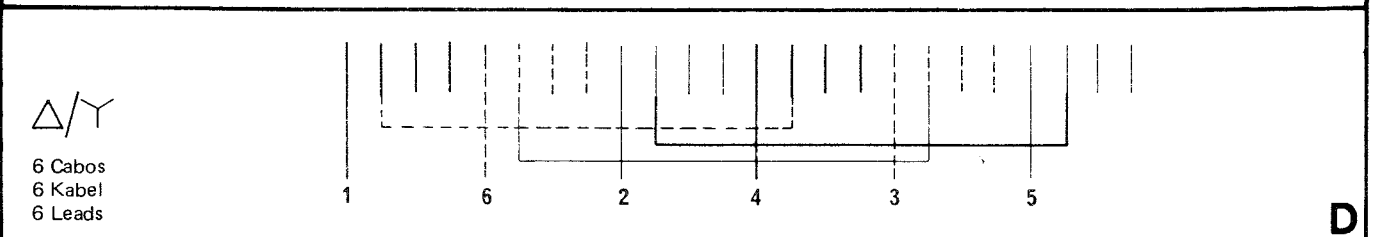
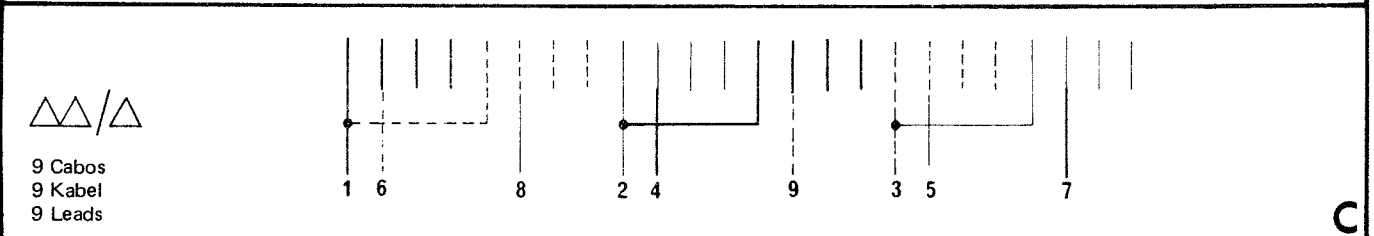
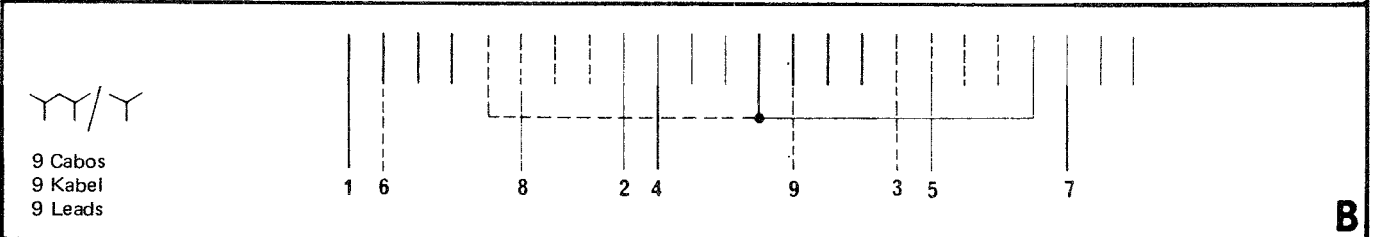
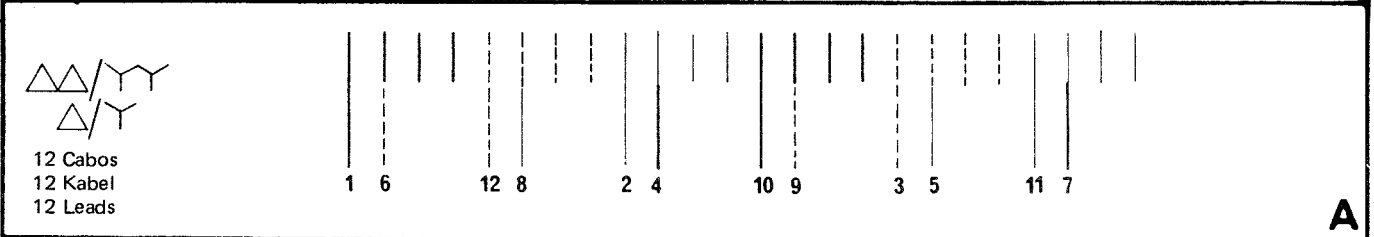
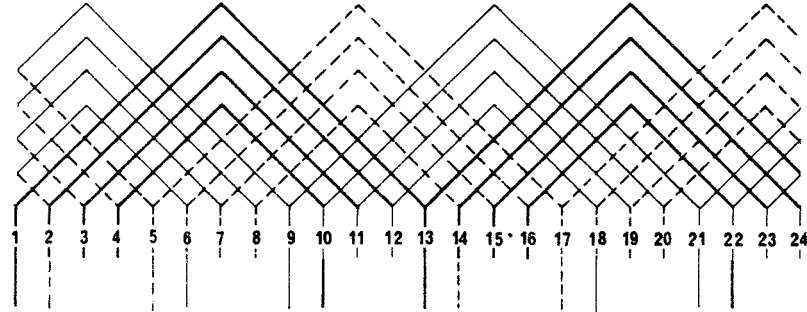


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ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	24 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:7:9:11:13
DREHSTROM	24 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:7:9:11:13
THREE-PHASE	24 SLOTS	2 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:7:9:11:13



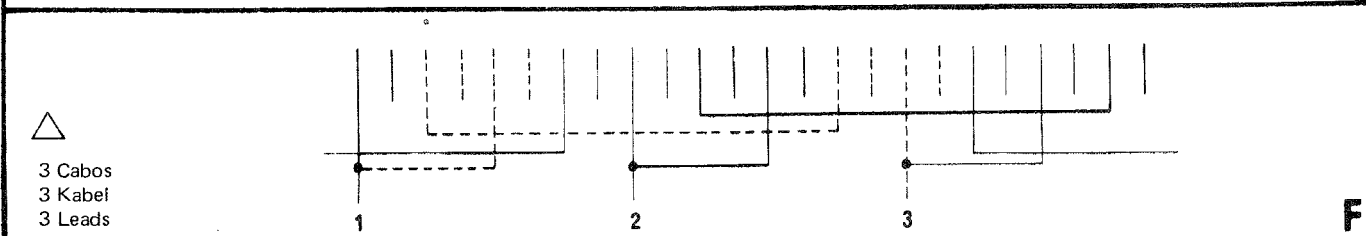
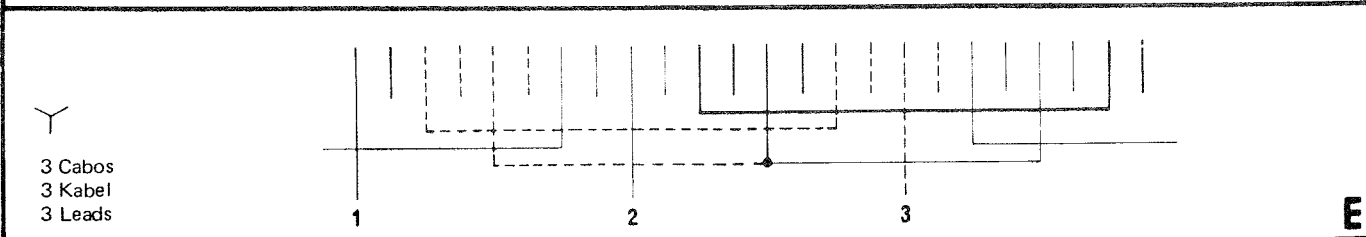
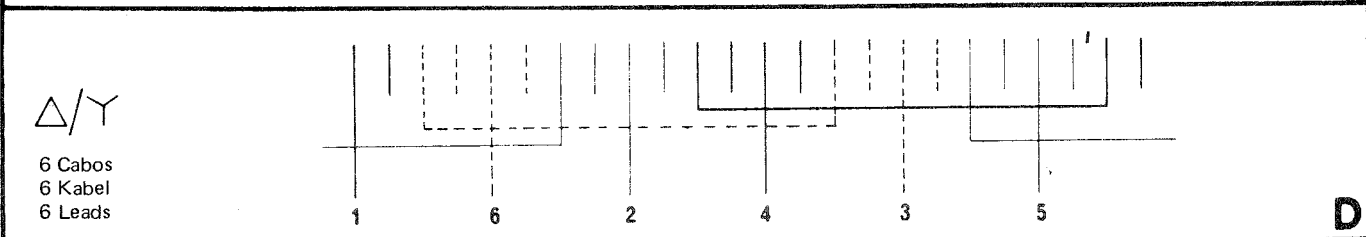
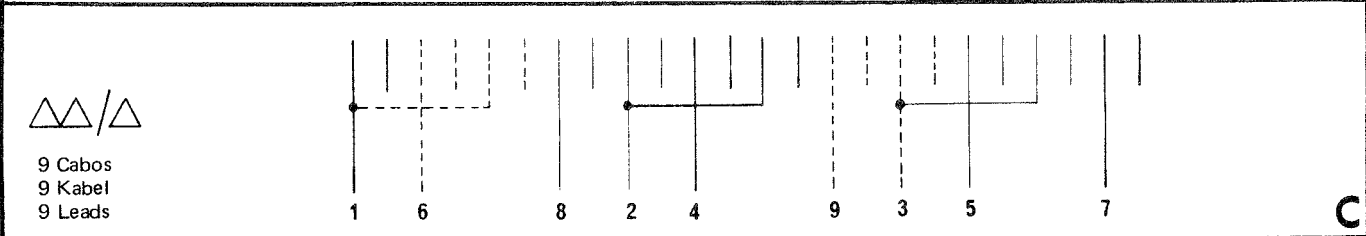
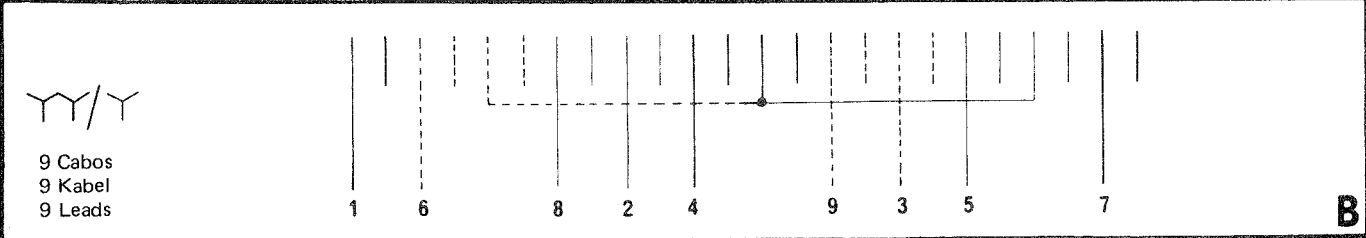
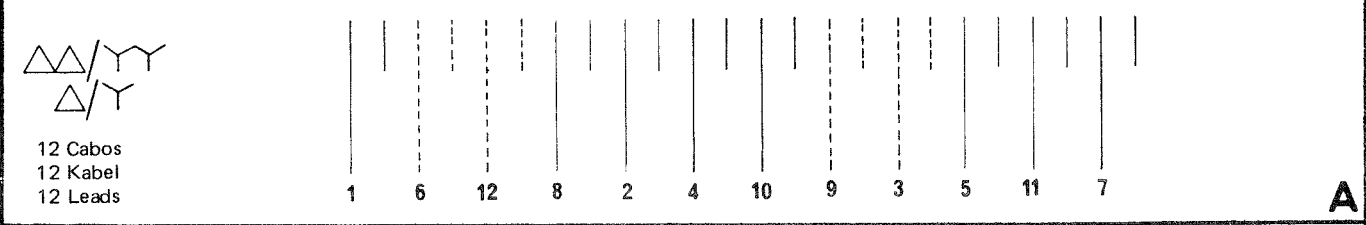
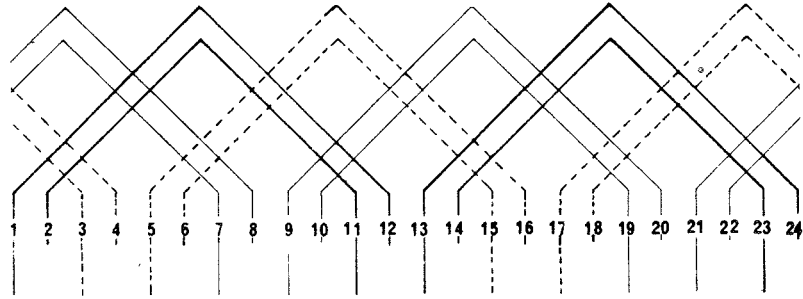
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

24 - 02 - 11/2  
(24-002-11/111-N)\*

TRIFÁSICO	24 RANHURAS	2 POLOS	CAMADA ÚNICA	CONCÊNTRICO SÉRIE	PASSO 1:10:12
DREHSTROM	24 NUTEN	2 POLE	EINZEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:10:12
THREE-PHASE	24 SLOTS	2 POLES	SINGLE LAYER	SÉRIE CONCENTRIC	PITCH 1:10:12



24 - 04 - 06/1  
(24-004-06/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

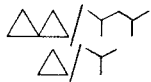
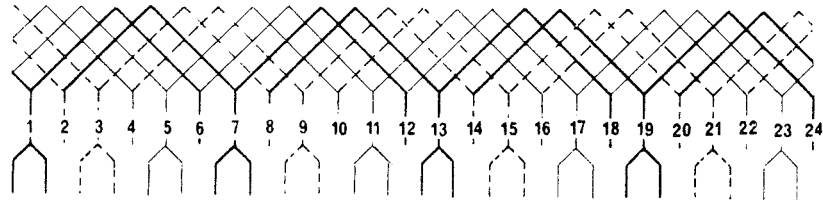
24 RANHURAS  
24 NUTEN  
24 SLOTS

4 POLOS  
4 POLE  
4 POLES

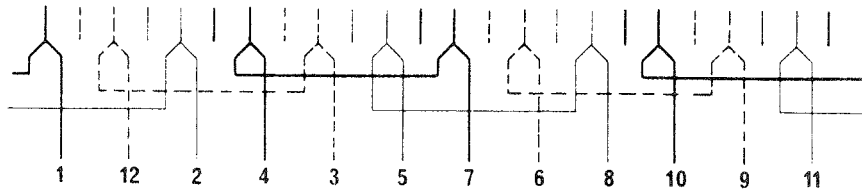
CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

IMBRICADO SÉRIE  
TRÄUFEL-WICKLUNG SÉRIE  
SERIES LAP

PASSO 1:6  
WICKEL-SCHRITT 1:6  
PITCH 1:6



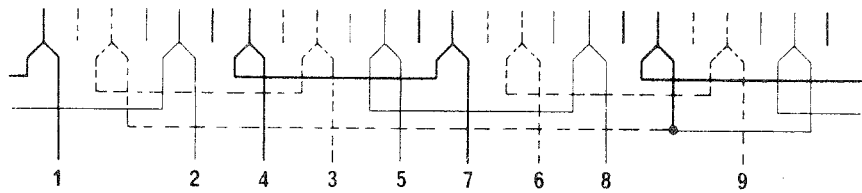
12 Cabos  
12 Kabel  
12 Leads



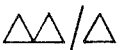
A



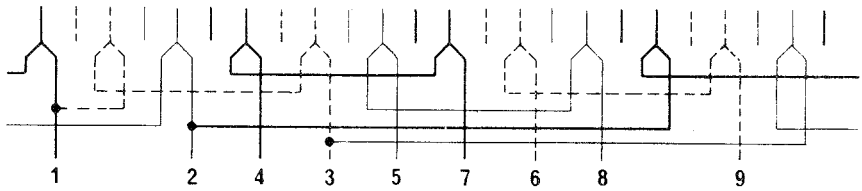
9 Cabos  
9 Kabel  
9 Leads



B



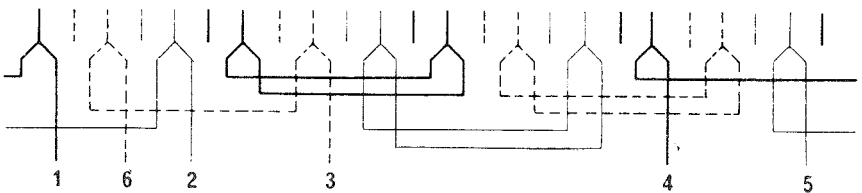
9 Cabos  
9 Kabel  
9 Leads



C



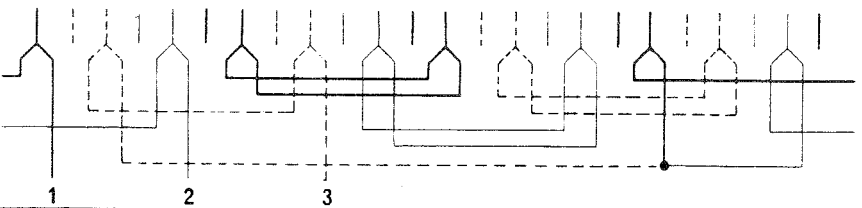
6 Cabos  
6 Kabel  
6 Leads



D



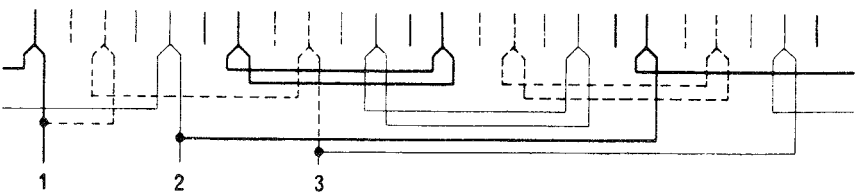
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

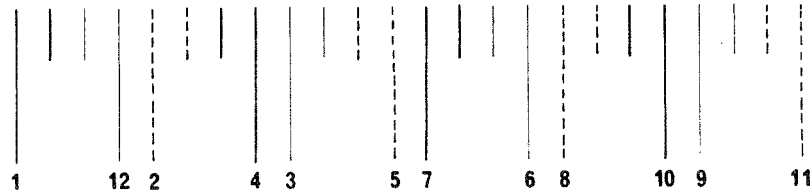
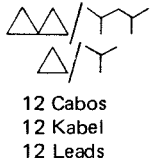
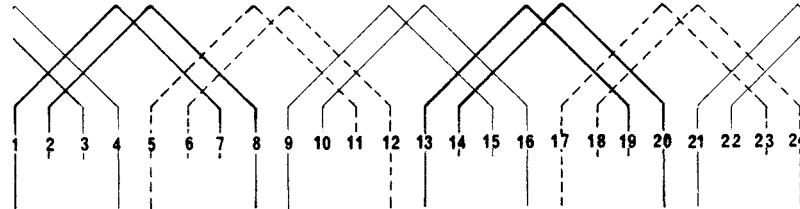
\*Nova nomenclatura



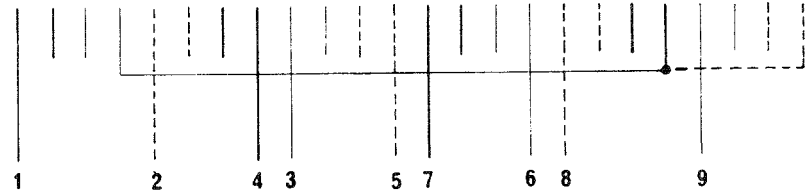
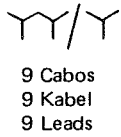
**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

24 - 04 - 07/1  
(24-004-06/112-N)\*

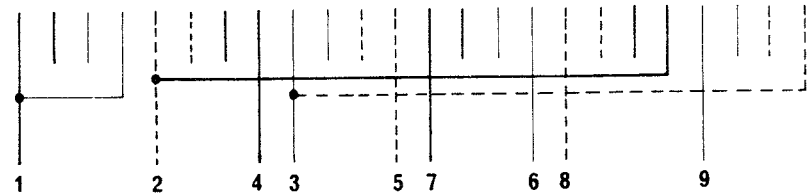
TRIFÁSICO	24 RANHURAS	4 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:7
DREHSTROM	24 NUTEN	4 POLE	EINZEL-SCHICHT	TRAUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:7
THREE-PHASE	24 SLOTS	4 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:7



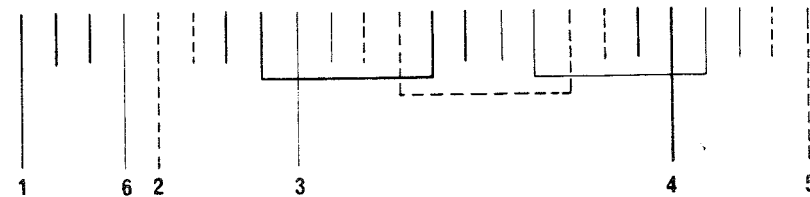
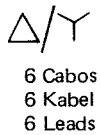
**A**



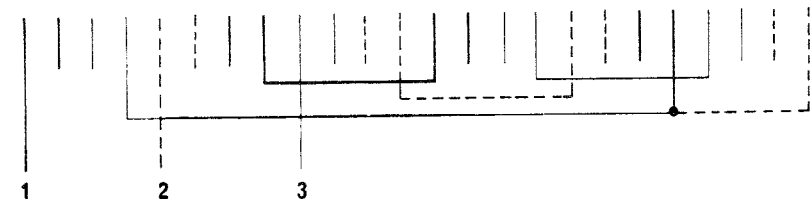
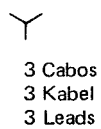
**B**



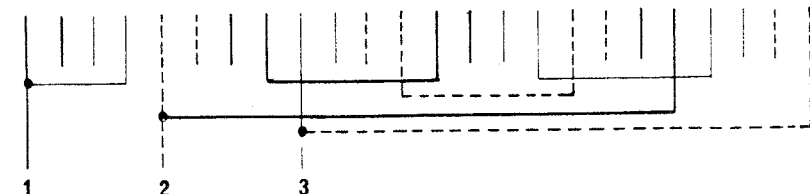
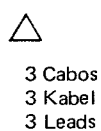
**C**



**D**



**E**



**F**

24 - 04 - 06/2  
(24-004-06/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

24 RANHURAS

4 POLOS

CAMADA DUPLA

CONCÊNTRICO SÉRIE

PASSO 15:7

DREHSTROM

24 NUTEN

4 POLE

DOPPEL SCHICHT

KONZENTRISCHE SÉRIE

WICKEL-SCHRITT 15:7

THREE-PHASE

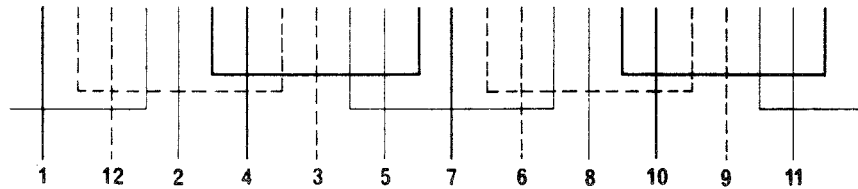
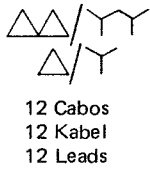
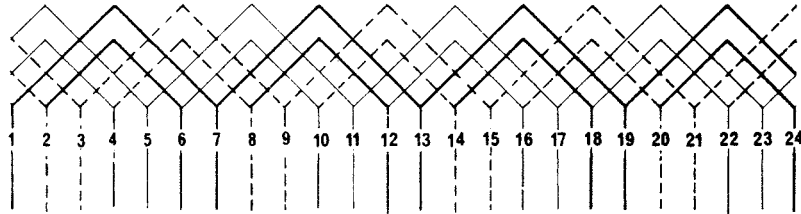
24 SLOTS

4 POLES

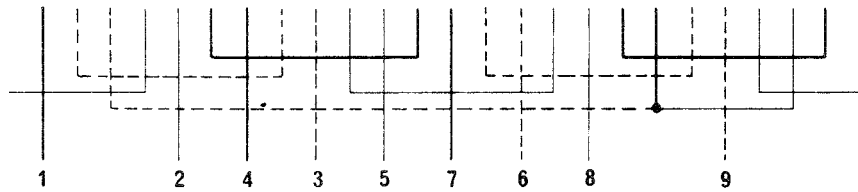
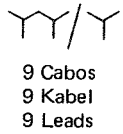
TWO LAYER

SERIES CONCENTRIC

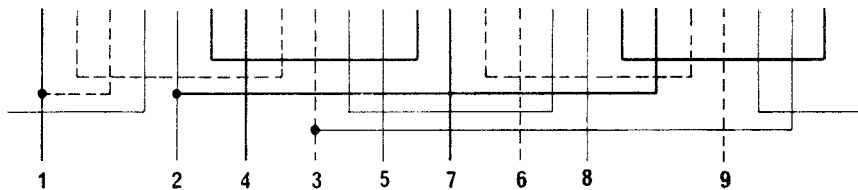
PITCH 15:7



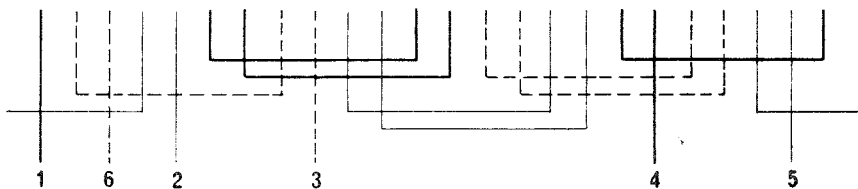
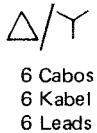
A



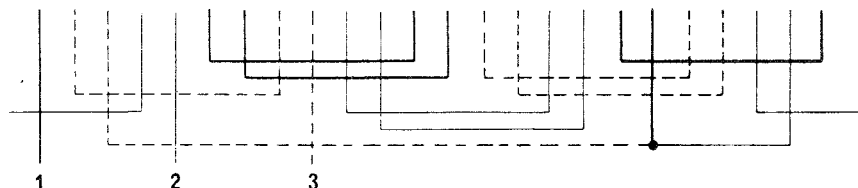
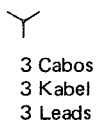
B



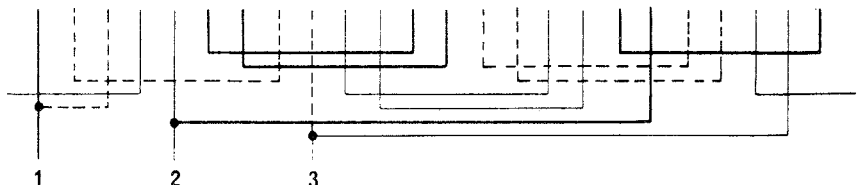
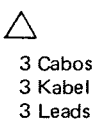
C



D



E



F

\*Nova nomenclatura

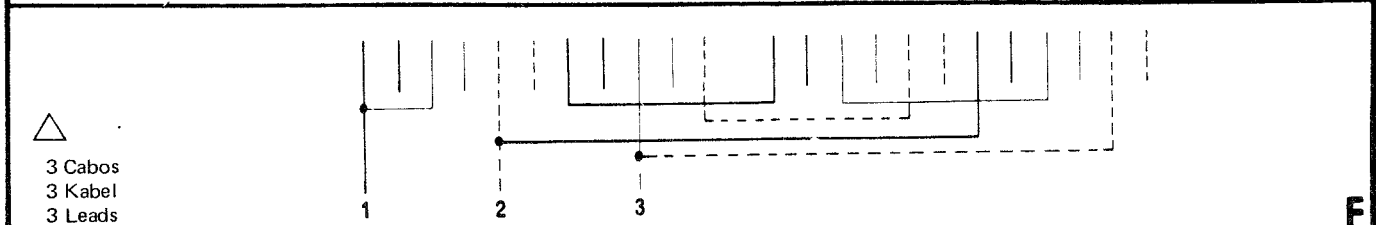
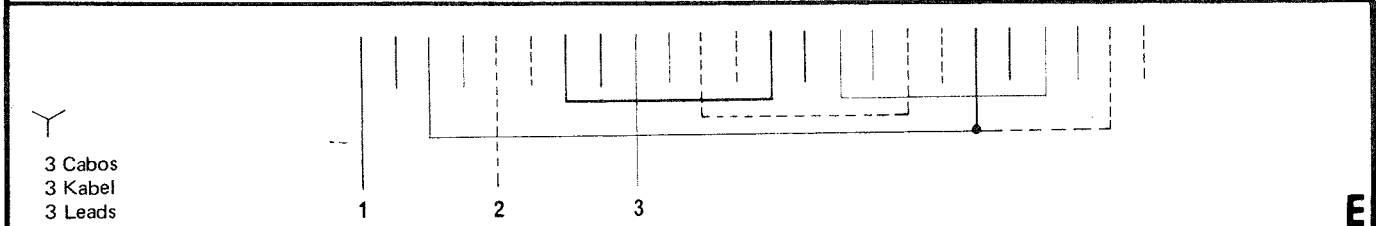
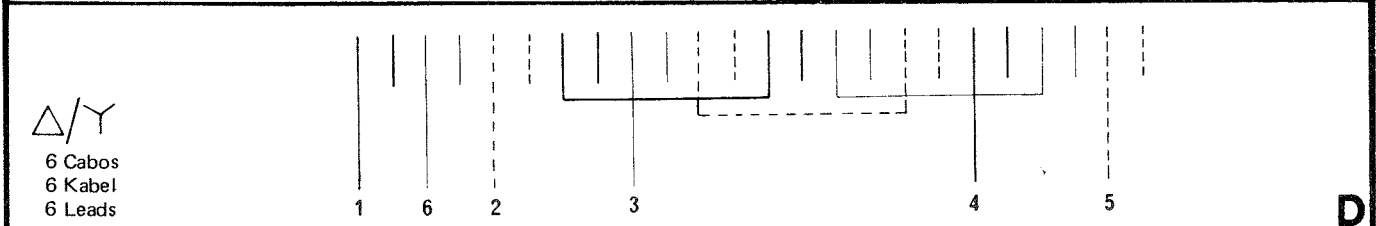
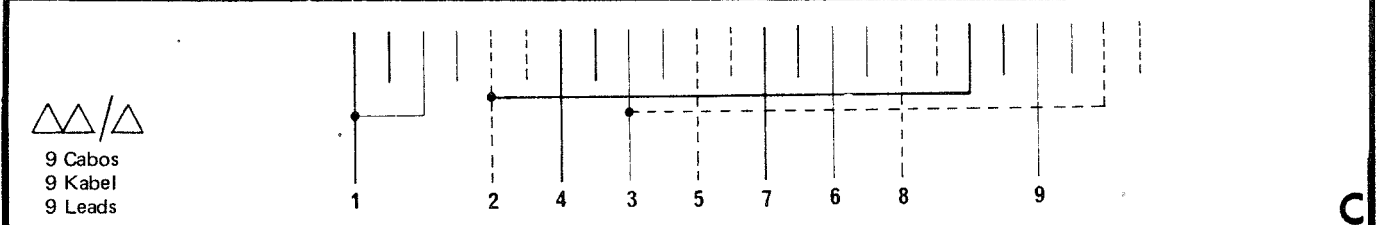
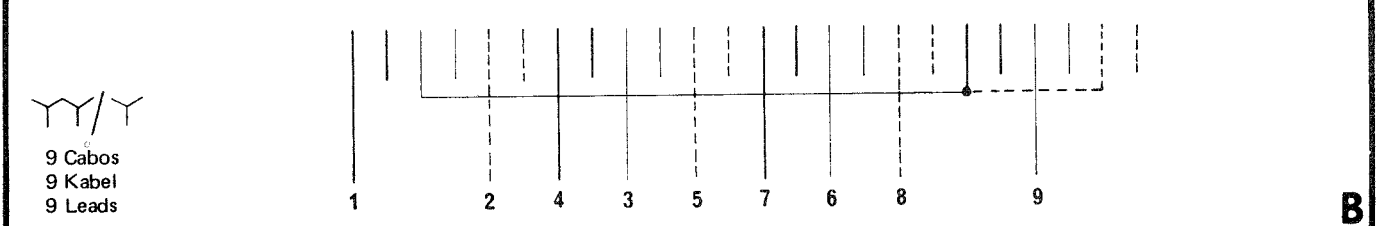
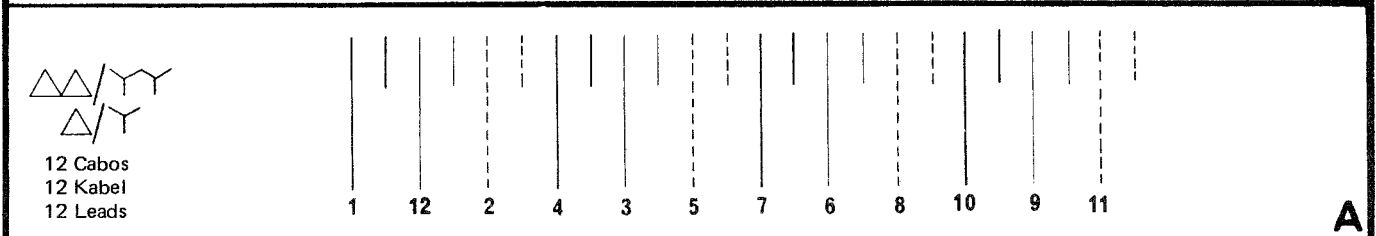
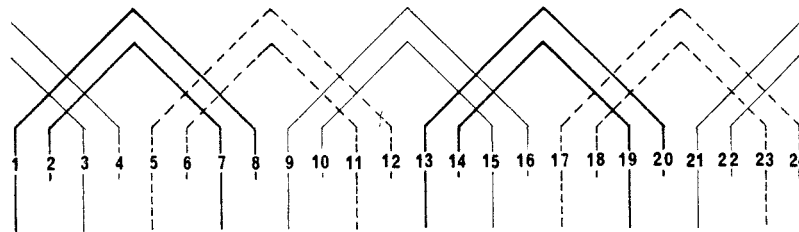




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

24 - 04 - 07/2  
(24-004-07/111-N)\*

TRIFÁSICO	24 RANHURAS	4 POLOS	CAMADA ÚNICA	CONCÊNTRICO SÉRIE	PASSO 1:6:8
DREHSTROM	24 NUTEN	4 POLE	EINZEL-SCHICHT	KONZENTRISCHE SERIE	WICKEL-SCHRITT 1:6:8
THREE-PHASE	24 SLOTS	4 POLES	SINGLE LAYER	SERIES CONCENTRIC	PITCH 1:6:8

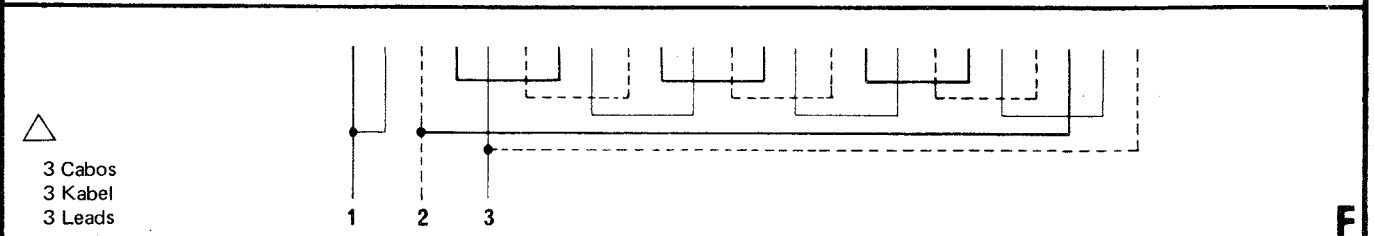
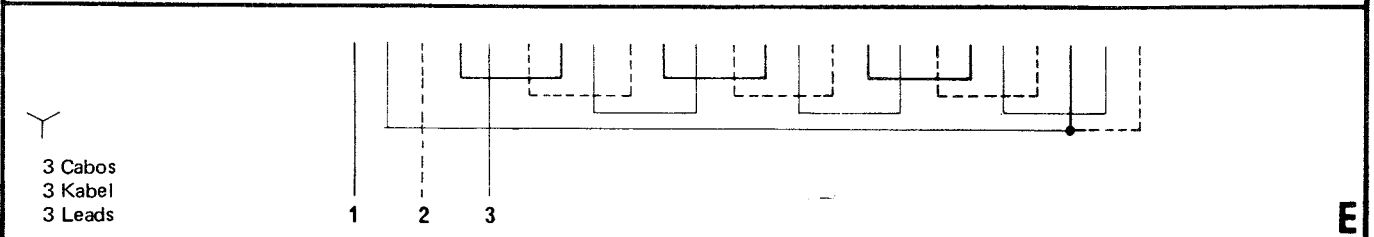
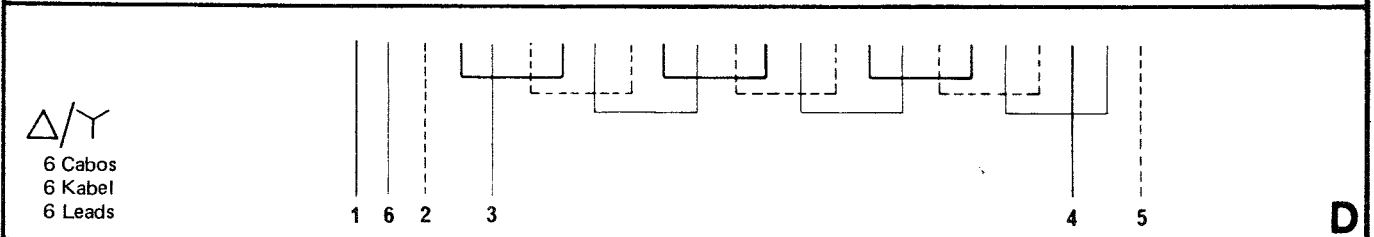
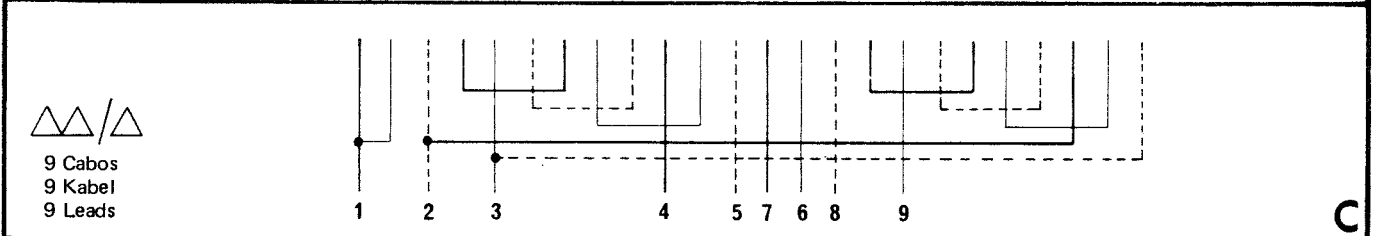
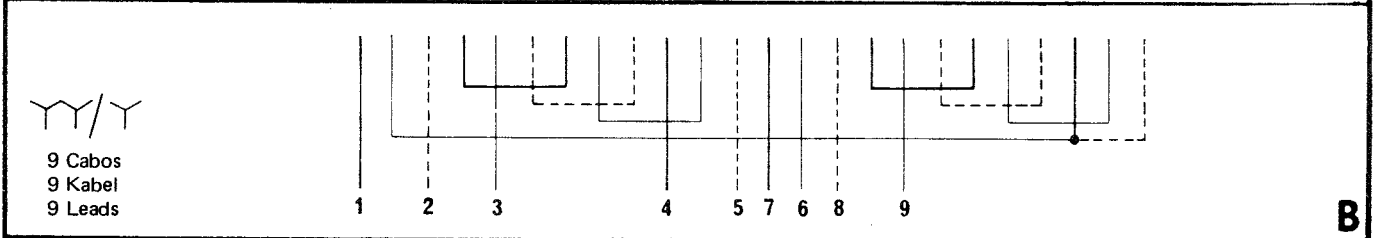
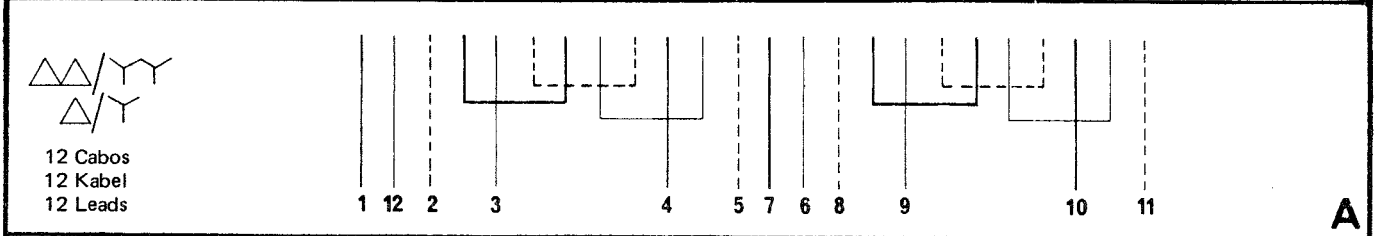
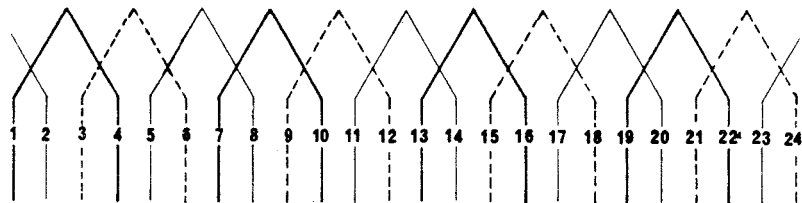


24 - 08 - 04/1  
(24-008-04/112-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	24 RANHURAS	8 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:4
DREHSTROM	24 NUTEN	8 POLE	EINZEL-SCHICHT	SERIE	WICKEL-SCHRITT 1:4
THREE-PHASE	24 SLOTS	8 POLES	SINGLE LAYER	SERIES	PITCH 1:4



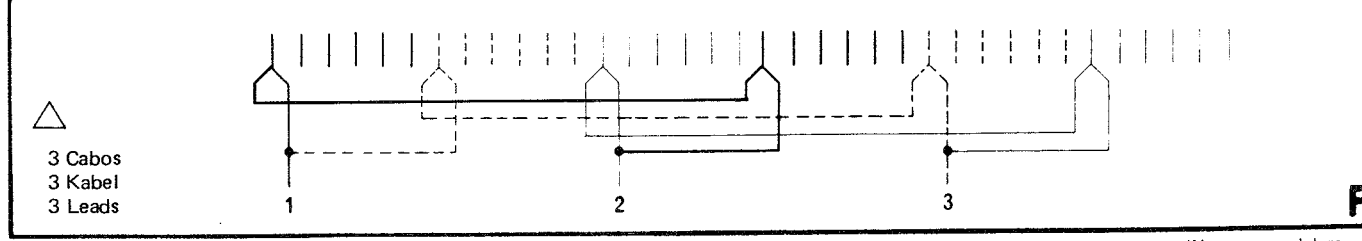
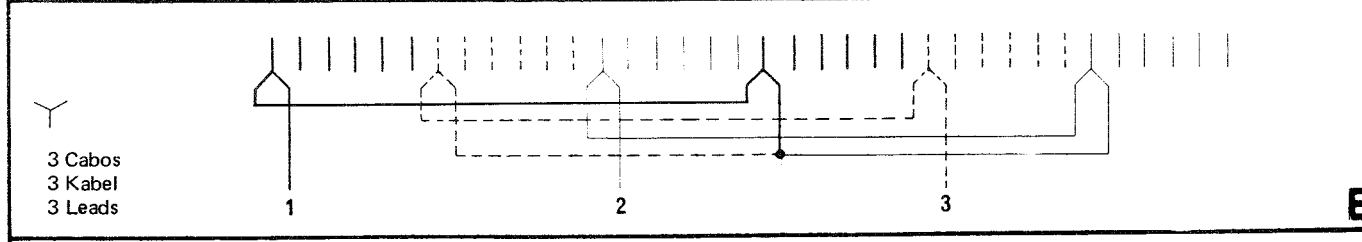
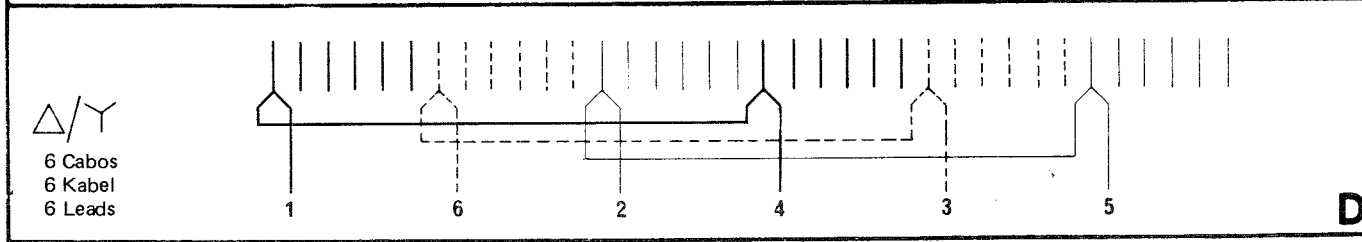
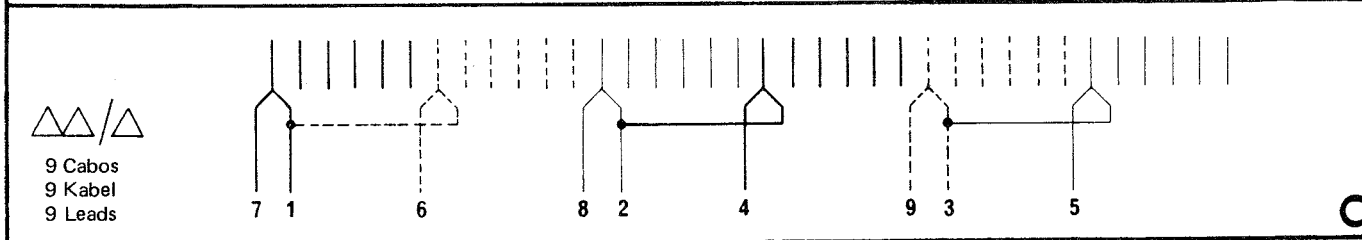
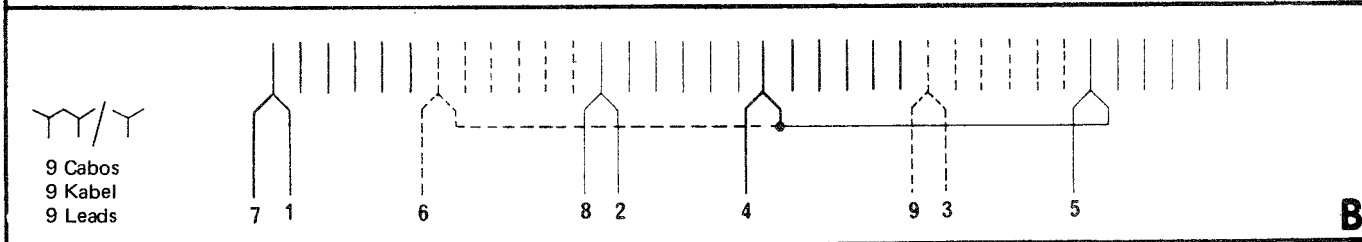
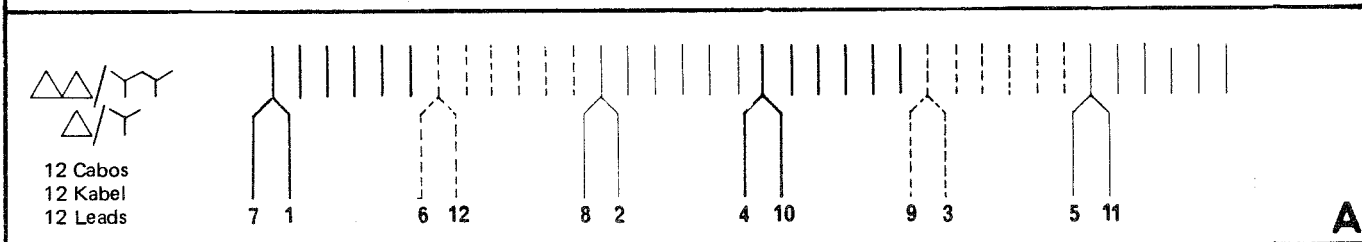
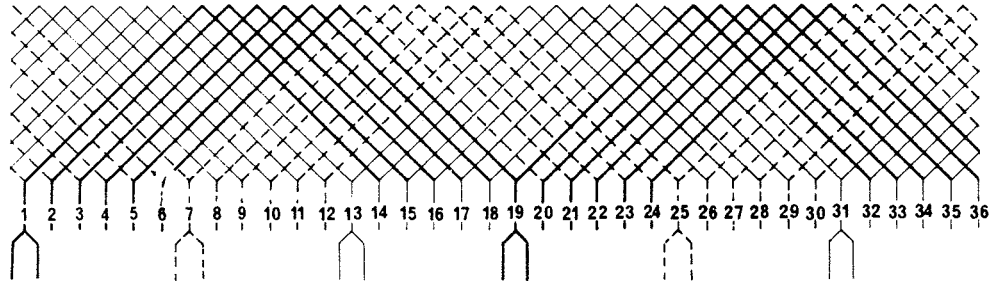
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 02 - 14/1  
(36-002-14/122-N)\*

TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:14
DREHSTROM	36 NUTEN	2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:14
THREE-PHASE	36 SLOTS	2 POLES	TWO LAYER	SERIES LAP	PITCH 1:14



36 - 02 - 16/1  
(36-002-16/112-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

36 RANHURAS

2 POLOS

CAMADA ÚNICA

IMBRICADO SÉRIE

PASSO 1:16

DREHSTROM

36 NUTEN

2 POLE

EINZEL-SCHICHT

TRÄUFEL-WICKLUNG SÉRIE

WICKEL-SCHRITT 1:16

THREE-PHASE

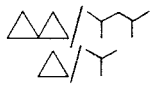
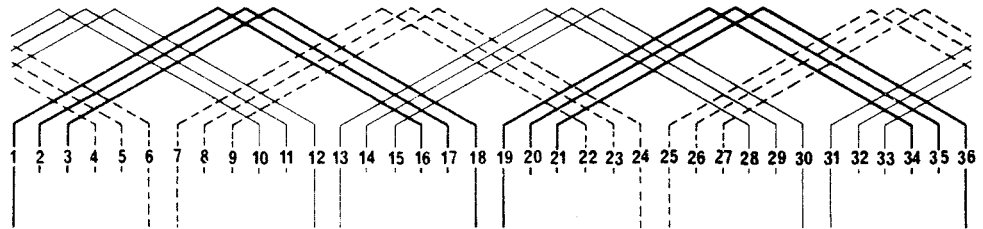
36 SLOTS

2 POLES

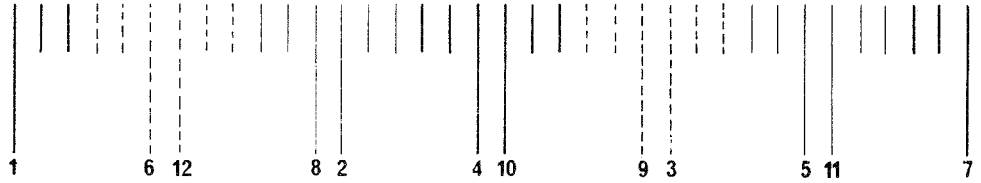
SINGLE LAYER

SERIES LAP

PITCH 1:16



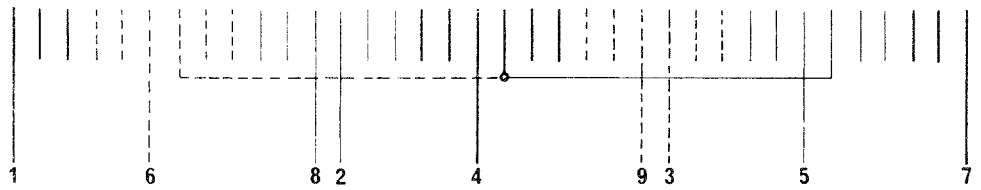
12 Cabos  
12 Kabel  
12 Leads



A



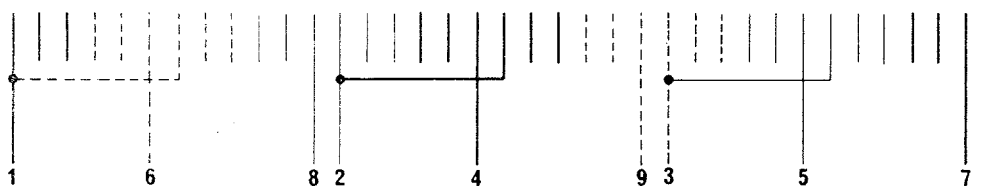
9 Cabos  
9 Kabel  
9 Leads



B



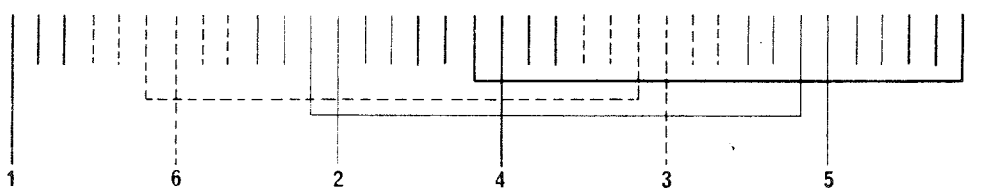
9 Cabos  
9 Kabel  
9 Leads



C



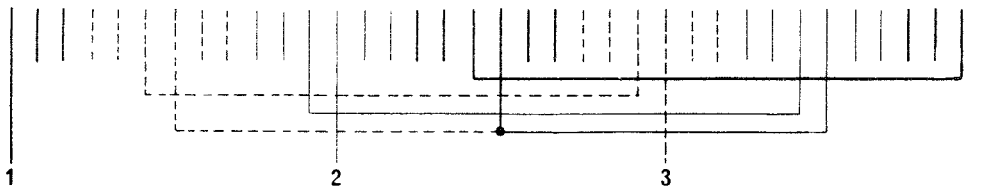
6 Cabos  
6 Kabel  
6 Leads



D



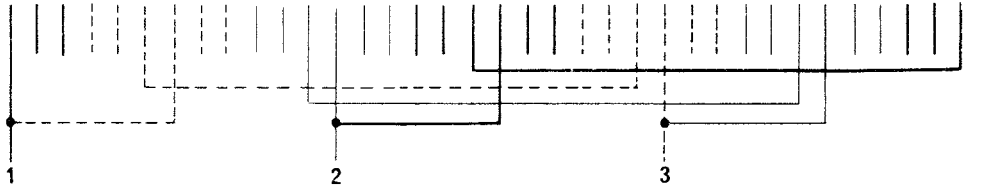
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

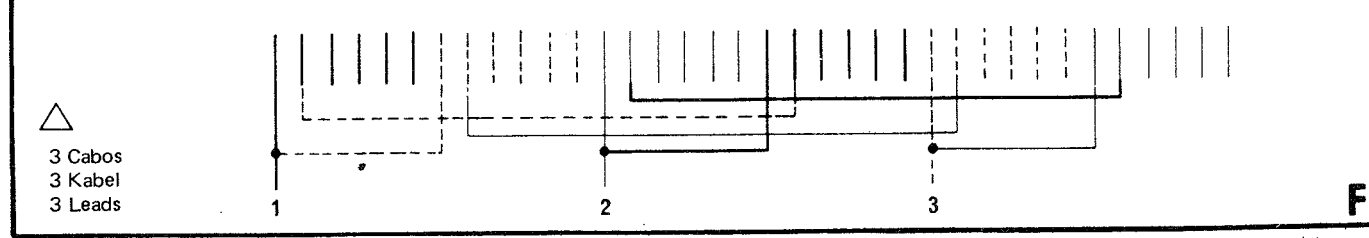
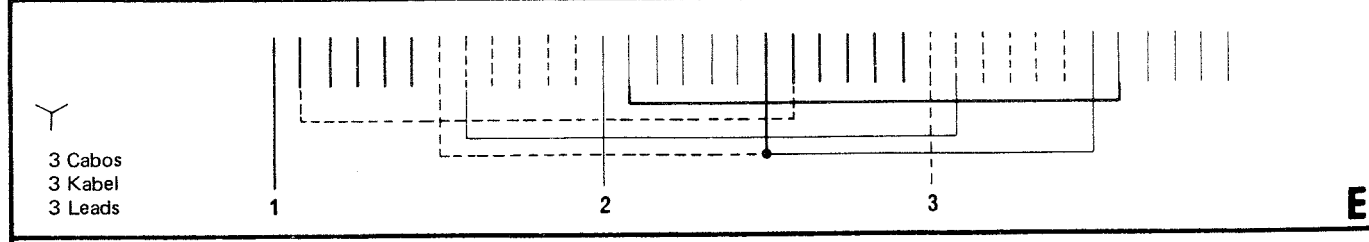
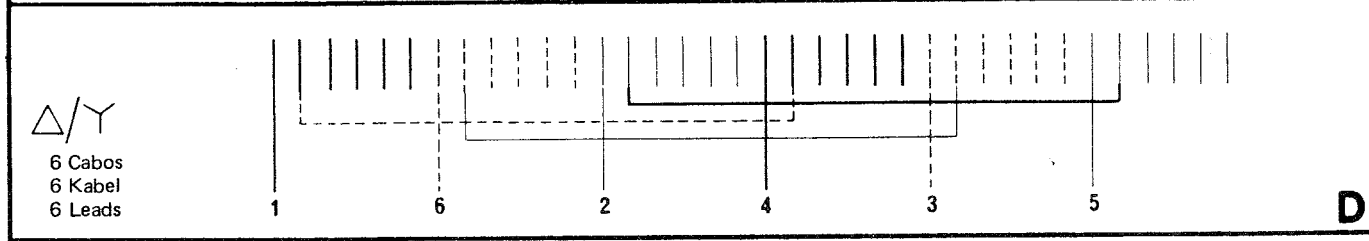
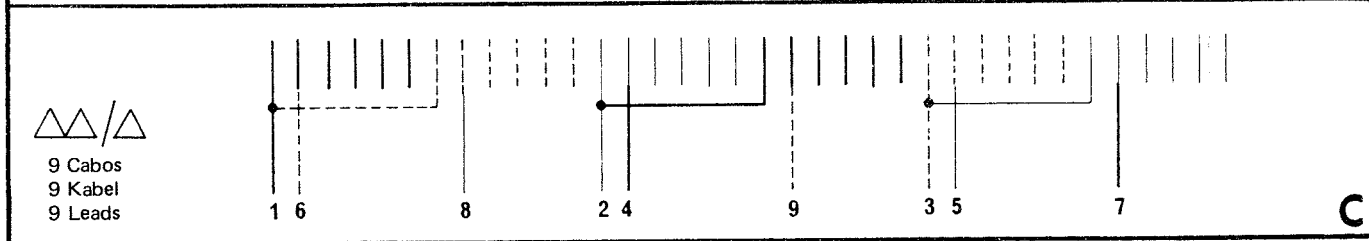
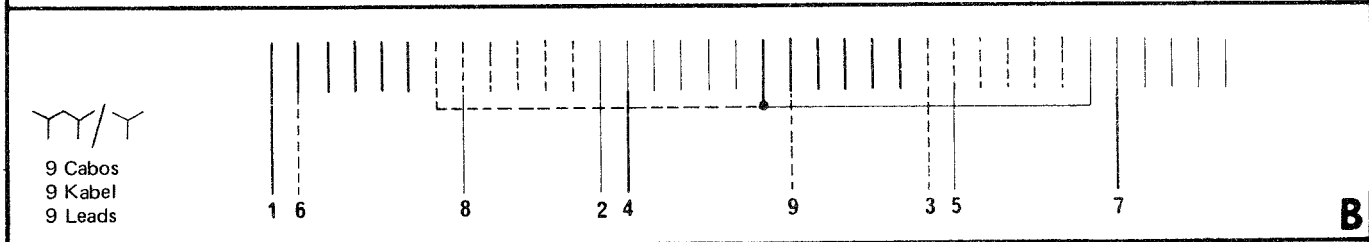
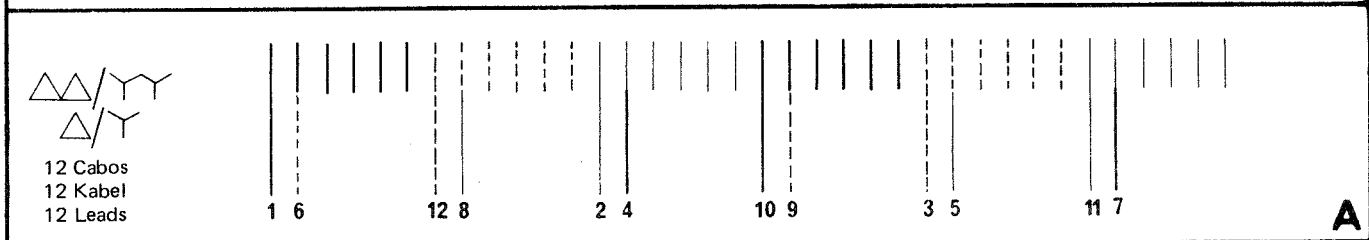
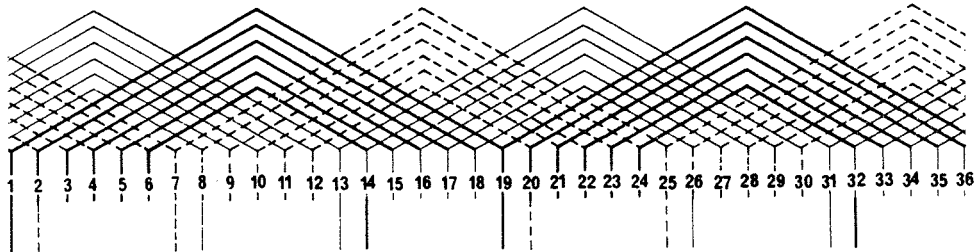
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 02 - 14/2  
(36-002-14/121-N)\*

TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:9:11:13 :15:17:19
DREHSTROM	36 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT :15:17:19
THREE-PHASE	36 SLOTS	2 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:9:11:13 :15:17:19



36 - 02 - 16/2  
(36-002-16/111-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

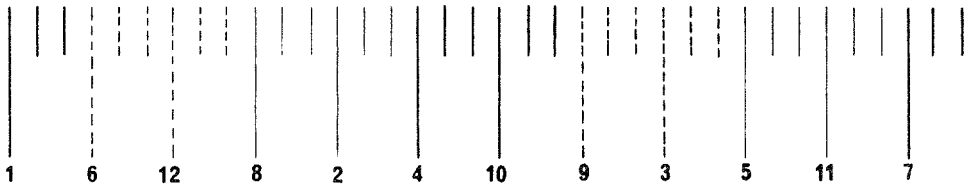
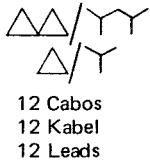
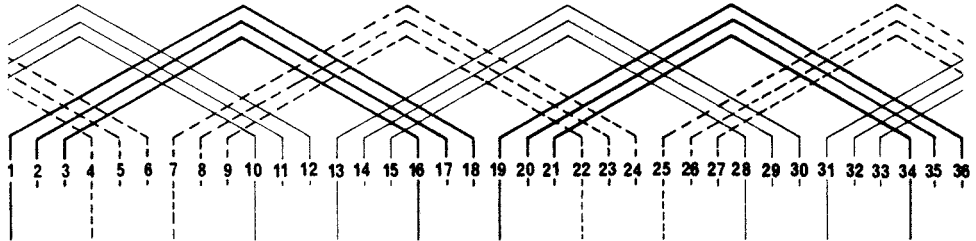
36 RANHURAS  
36 NUTEN  
36 SLOTS

2 POLOS  
2 POLE  
2 POLES

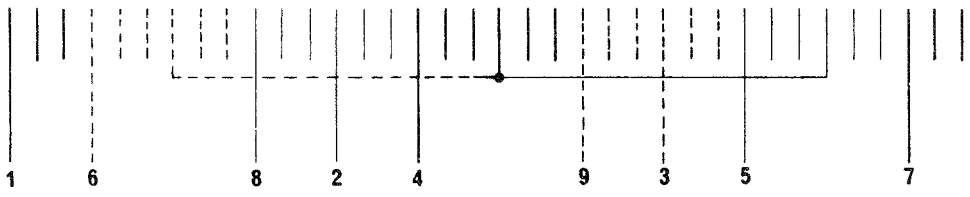
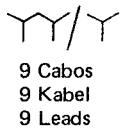
CAMADA ÚNICA  
EINZEL-SCHICHT  
SINGLE LAYER

CONCÉNTRICO SÉRIE  
KONZENTRISCHE SÉRIE  
SERIES CONCENTRIC

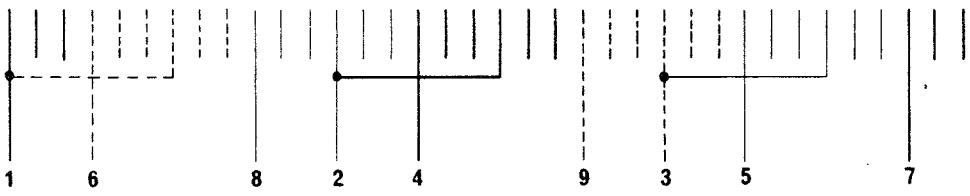
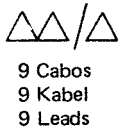
PASSO 1:14:16:18  
WICKEL-SCHRITT 1:14:16:18  
PITCH 1:14:16:18



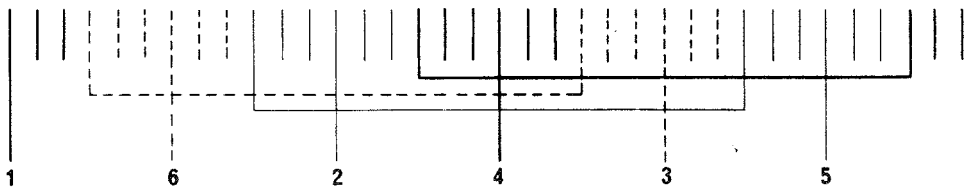
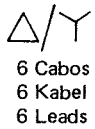
**A**



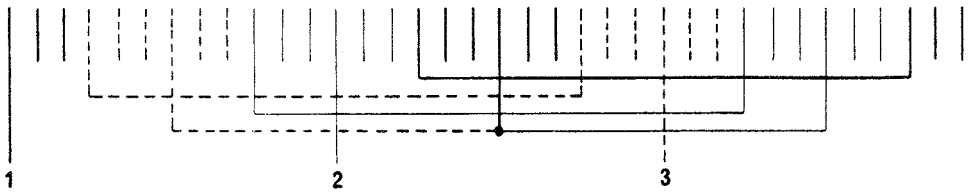
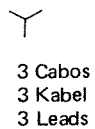
**B**



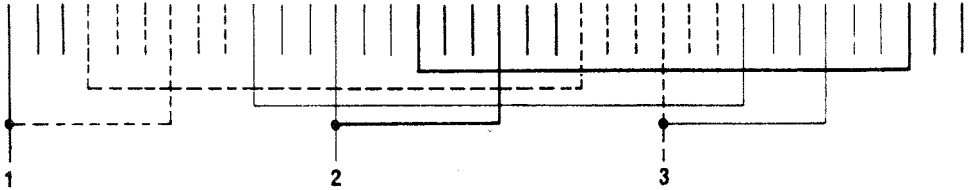
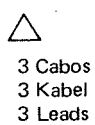
**C**



**D**



**E**



**F**

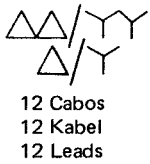
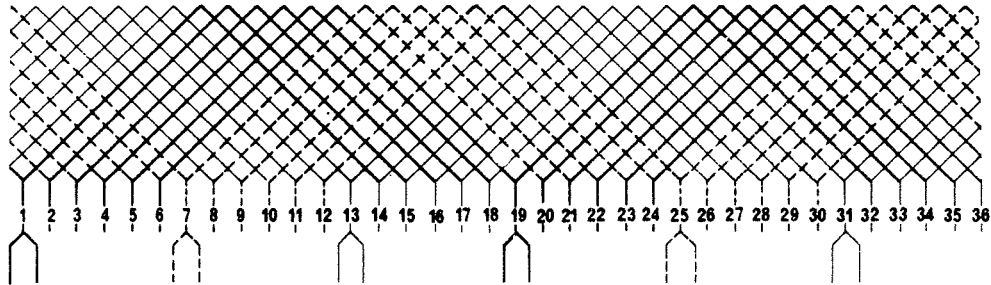
\*Nova nomenclatura



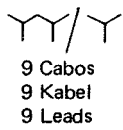
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 02 - 14/3  
(36-002-14/222-N)\*

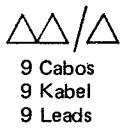
TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:14
DREHSTROM	36 NUTEN	2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:14
THREE-PHASE	36 SLOTS	2 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:14



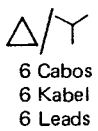
A



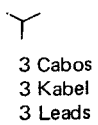
B



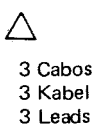
C



D



E

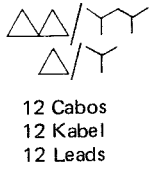
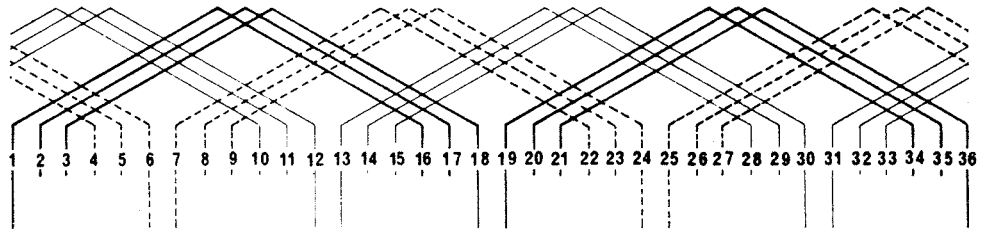


36 - 02 - 16/3  
(36-002-16/212-N)\*

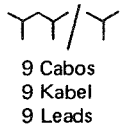
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA ÚNICA	IMBRICADO PARALELO	PASSO 1:16
DREHSTROM	36 NUTEN	2 POLE	EINZEL SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:16
THREE-PHASE	36 SLOTS	2 POLES	SINGLE LAYER	PARALLEL LAP	PITCH 1:16



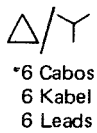
A



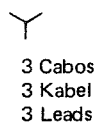
B



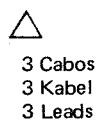
C



D



E



F

\*Nova nomenclatura

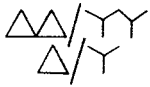
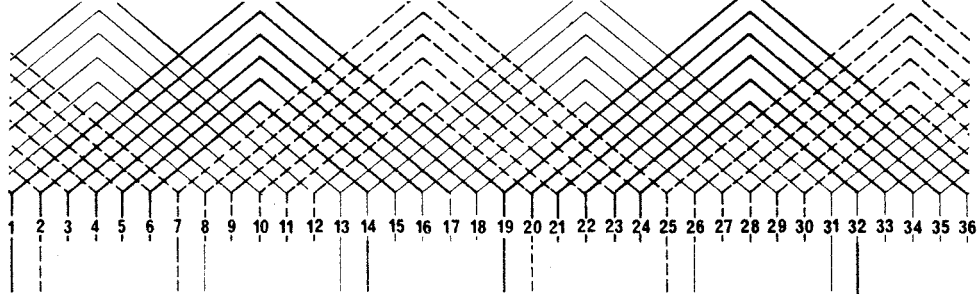




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

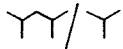
36 - 02 - 14/4  
(36-002-14/221-N)\*

TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:9:11:13 :15:17:19
DREHSTROM	36 NUTEN	2 POLE	DOPPEL SCHICHT	KONZENTRISCHE PARALLEL	WICKEL- 1:9:11:13 SCHRITT :15:17:19
THREE-PHASE	36 SLOTS	2 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:9:11:13 :15:17:19



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

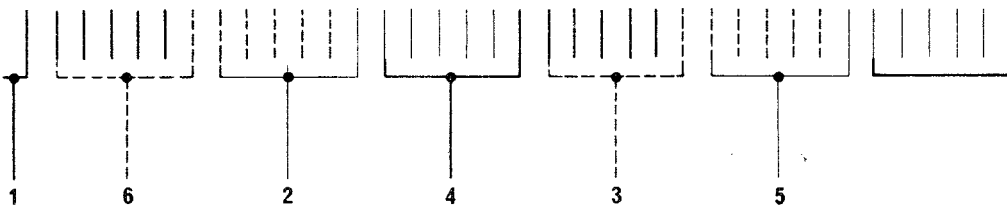


9 Cabos  
9 Kabel  
9 Leads

C



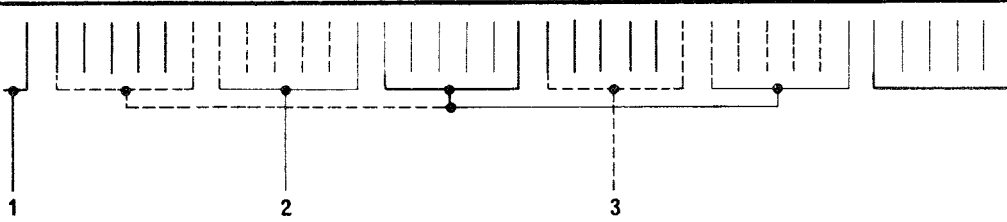
6 Cabos  
6 Kabel  
6 Leads



D



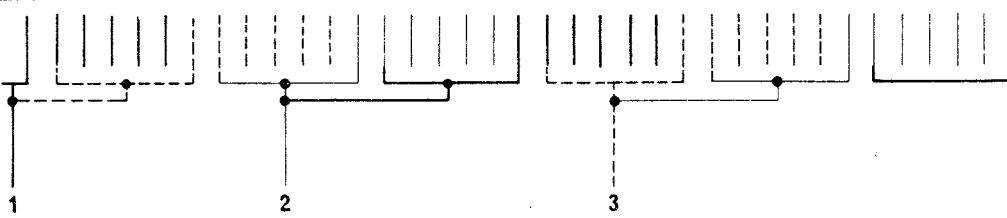
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



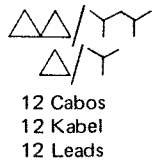
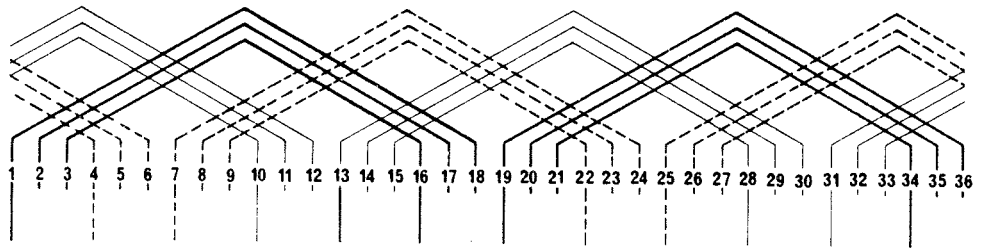
F

36 - 02 - 16/4  
(36-002-16/211-N)\*

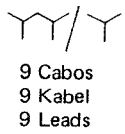
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



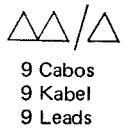
TRIFÁSICO	36 RANHURAS	2 POLOS	CAMADA ÚNICA	CONCÊNTRICO PARALELO	PASSO 1:14:16:18
DREHSTROM	36 NUTEN	2 POLE	EINZEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:14:16:18
THREE-PHASE	36 SLOTS	2 POLES	SINGLE LAYER	PARALLEL CONCENTRIC	PITCH 1:14:16:18



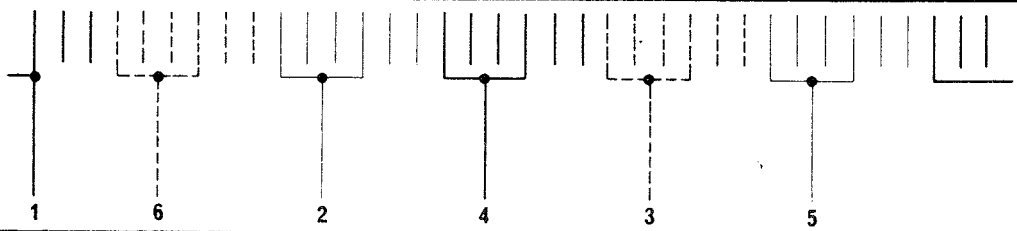
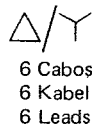
A



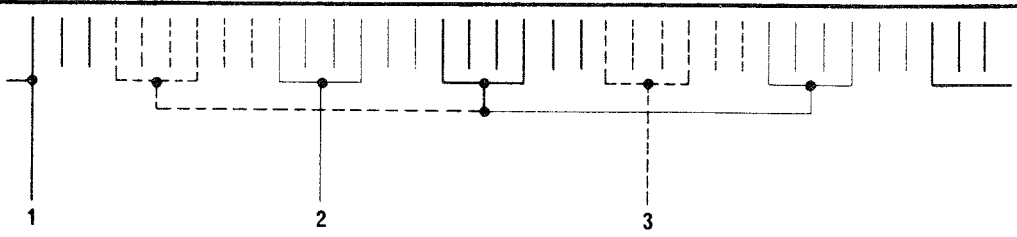
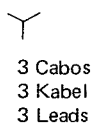
B



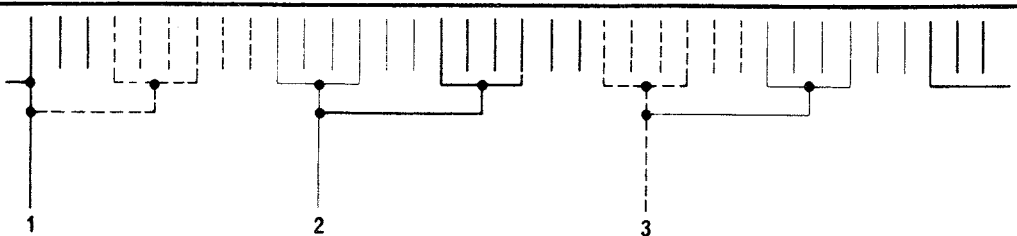
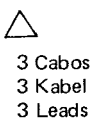
C



D



E



F

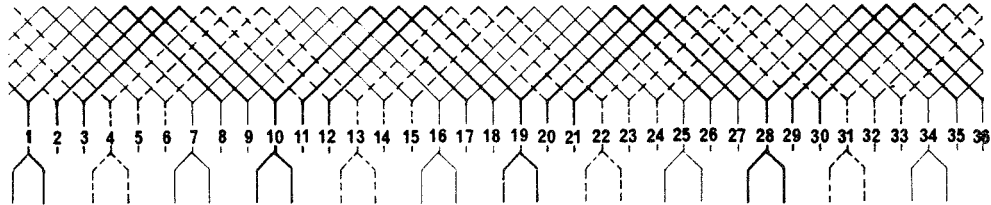
\*Nova nomenclatura



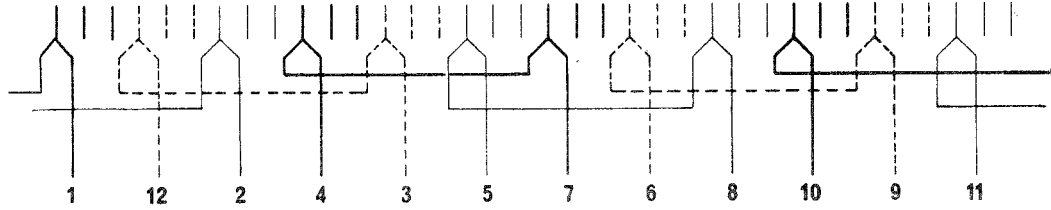
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 04 - 08/1  
(36-004-08/122-N)\*

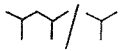
TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:8
DREHSTROM	36 NUTEN	4 POLE	DOPPEL-SCHICHT	TRÄUFEL WICKLUNG SÉRIE	WICKEL-SCHRITT 1:8
THREE-PHASE	36 SLOTS	4 POLES	TWO LAYER	SERIES LAP	PITCH 1:8



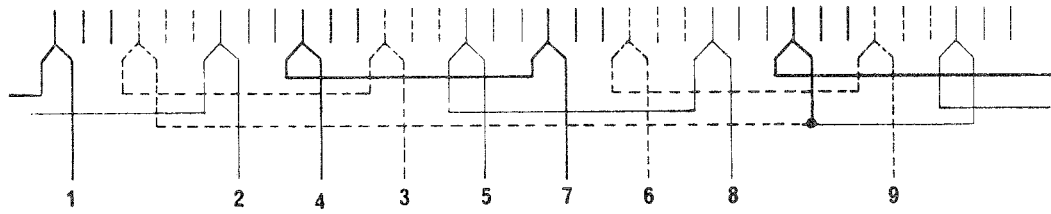
12 Cabos  
12 Kabel  
12 Leads



A



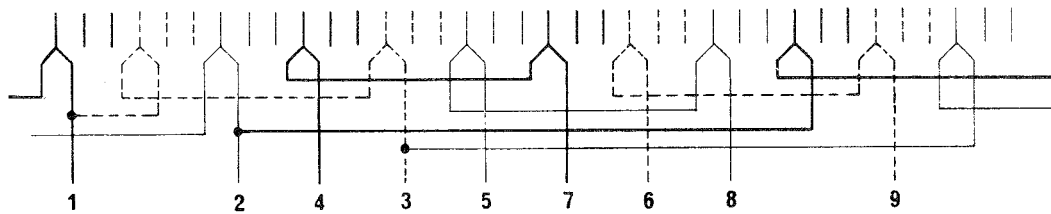
9 Cabos  
9 Kabel  
9 Leads



B



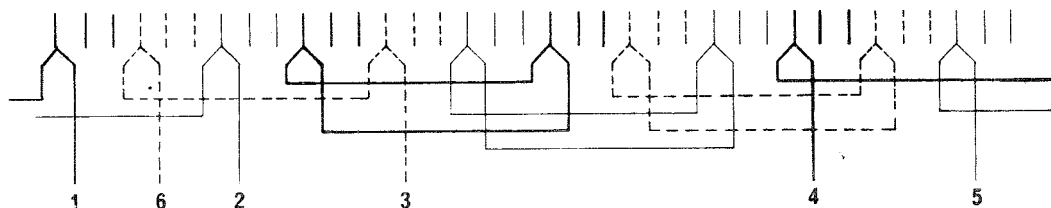
9 Cabos  
9 Kabel  
9 Leads



C



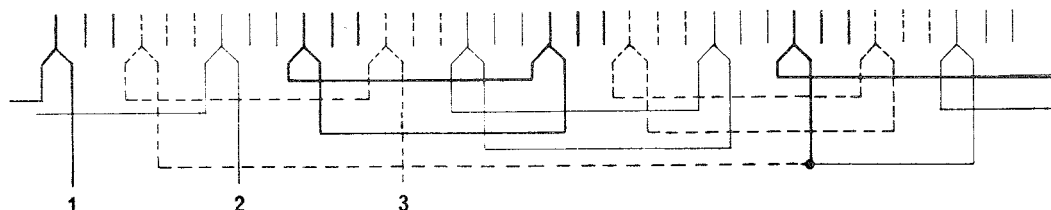
6 Cabos  
6 Kabel  
6 Leads



D



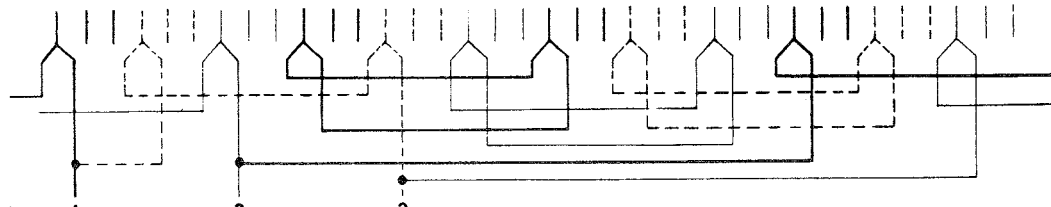
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



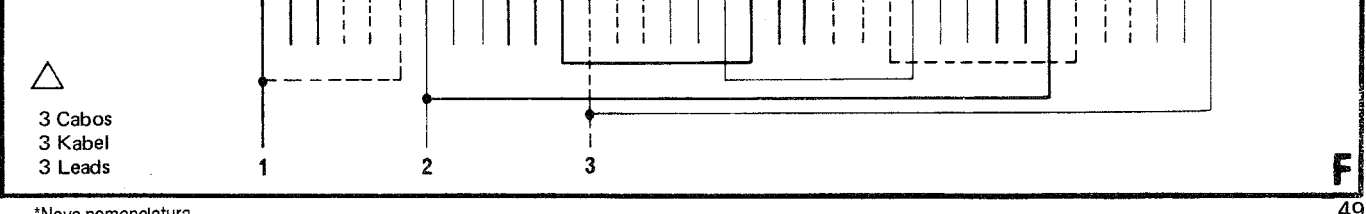
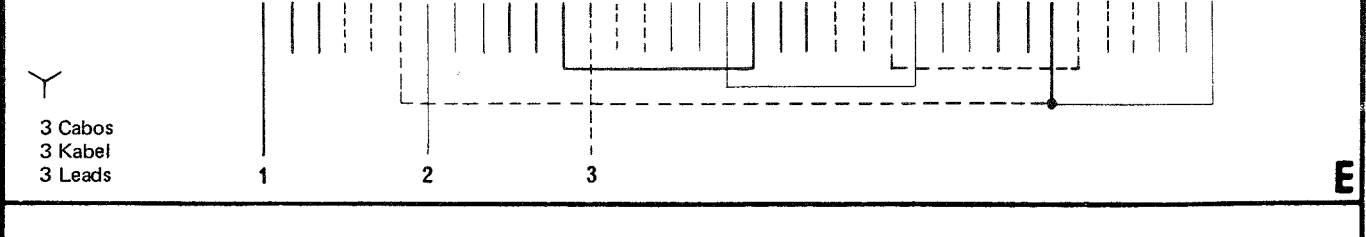
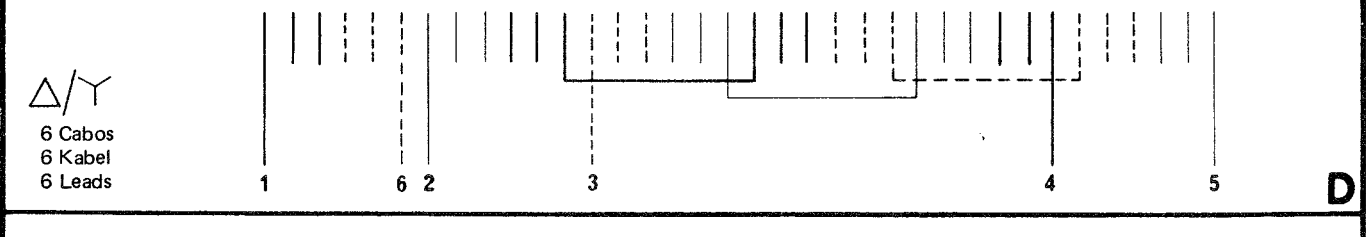
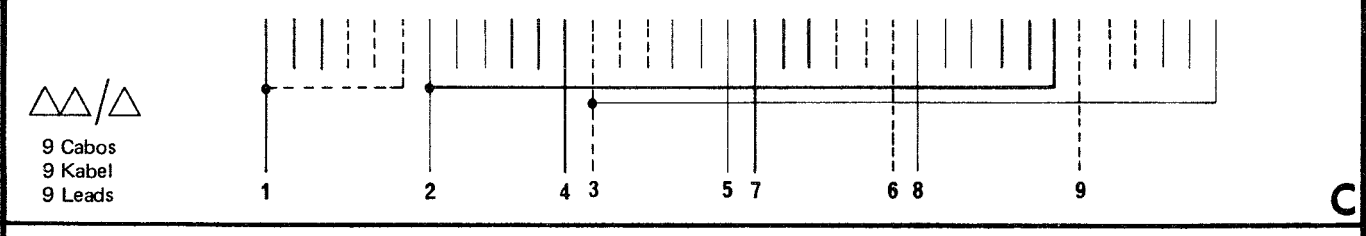
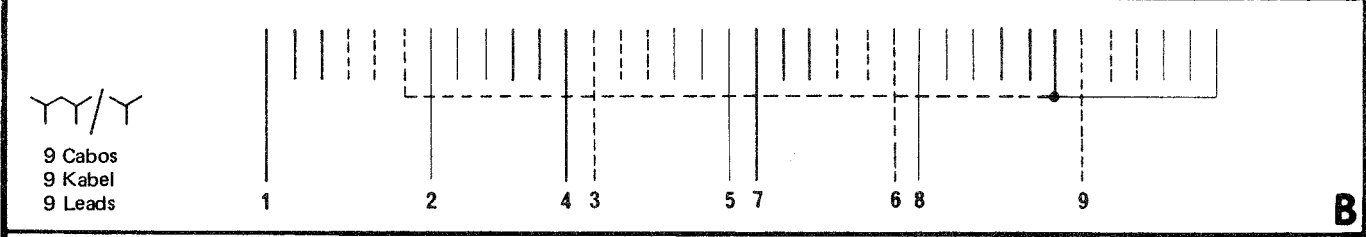
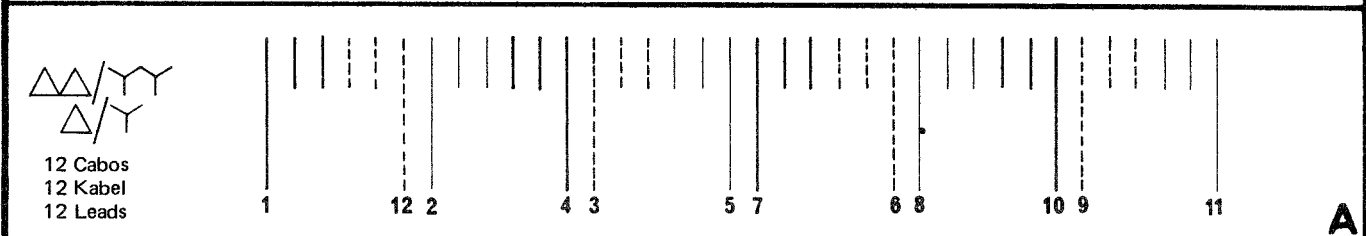
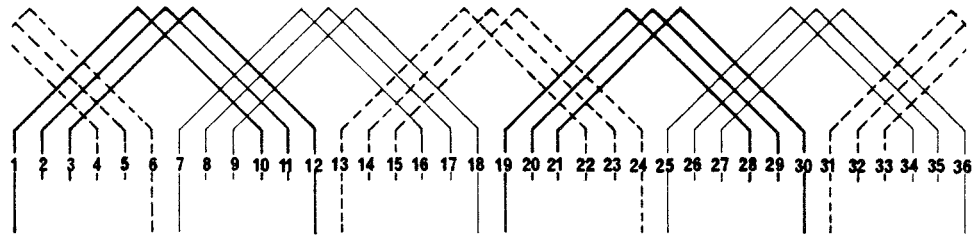
F

36 - 04 - 10/1  
(36-004-10/112-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:10
DREHSTROM	36 NUTEN	4 POLE	EINZEL-SCHICHT	TRAUFLWICKLUNG SÉRIE	WICKEL-SCHRITT 1:10
THREE-PHASE	36 SLOTS	4 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:10



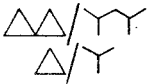
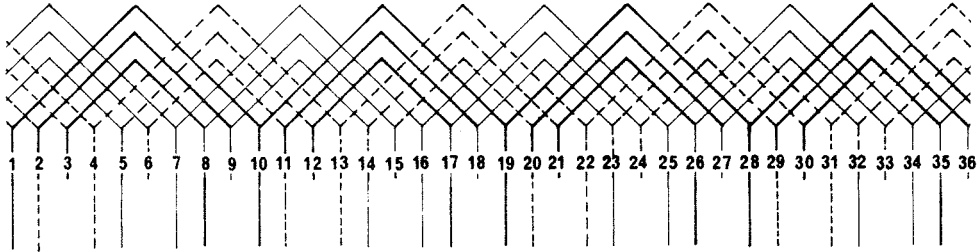
\*Nova nomenclatura



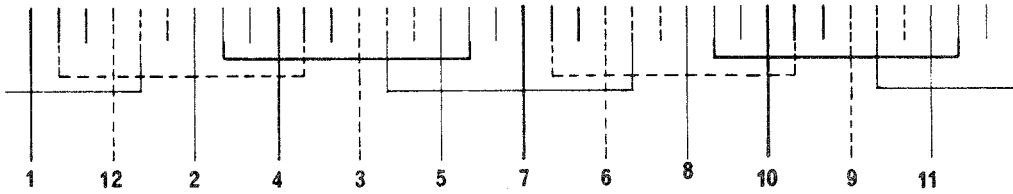
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 04 - 08/2  
(36-004-08/121-N)\*

TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:6:8:10
DREHSTROM	36 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	36 SLOTS	4 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:6:8:10



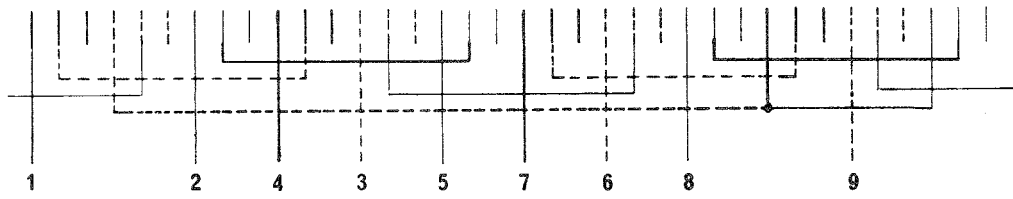
12 Cabos  
12 Kabel  
12 Leads



**A**



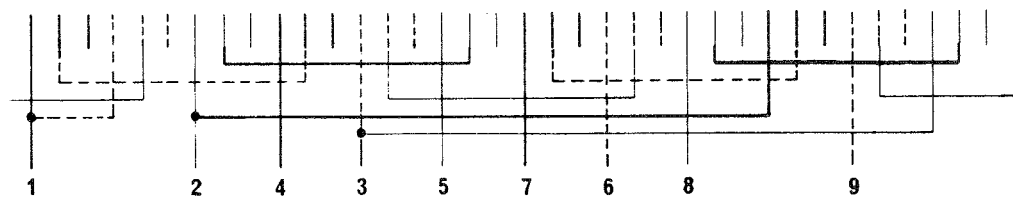
9 Cabos  
9 Kabel  
9 Leads



**B**



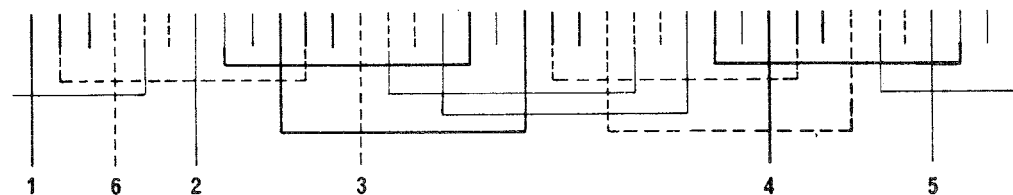
9 Cabos  
9 Kabel  
9 Leads



**C**



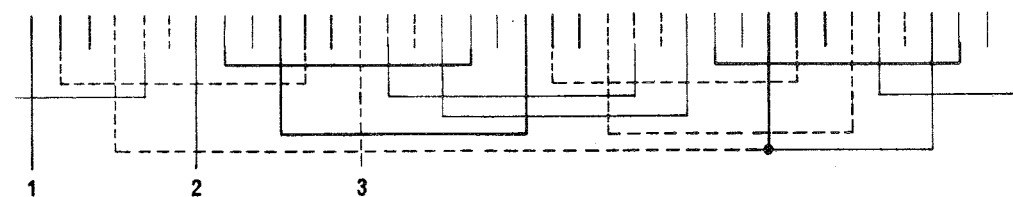
6 Cabos  
6 Kabel  
6 Leads



**D**



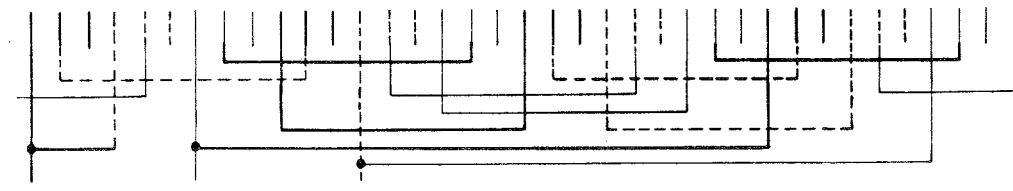
3 Cabos  
3 Kabel  
3 Leads



**E**



3 Cabos  
3 Kabel  
3 Leads



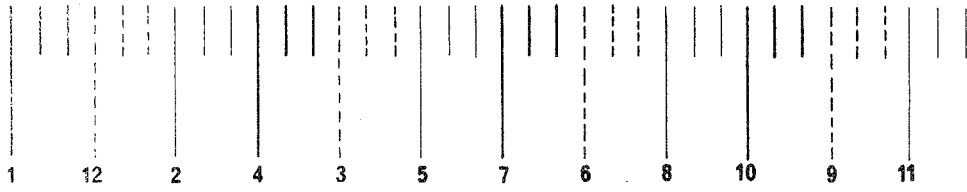
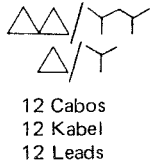
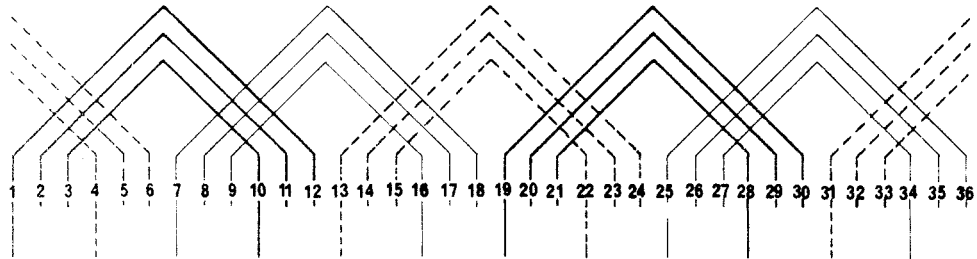
**F**

36 - 04 - 10/2  
(36-004-10/111-N)\*

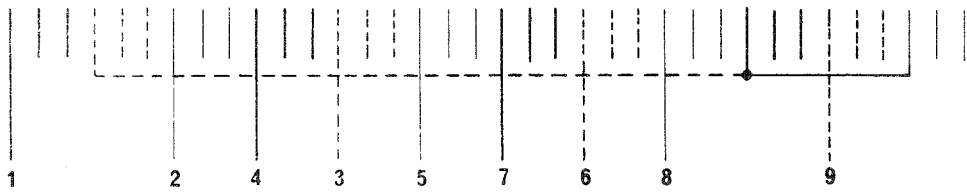
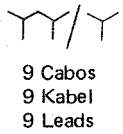
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



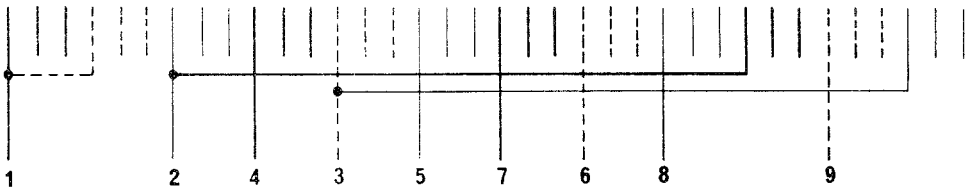
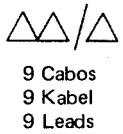
TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	CONCÊNTRICO SÉRIE	PASSO 1:8:10:12
DREHSTROM	36 NUTEN	4 POLE	EINZEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:8:10:12
THREE-PHASE	36 SLOTS	4 POLES	SINGLE LAYER	SÉRIES CONCENTRIC	PITCH 1:8:10:12



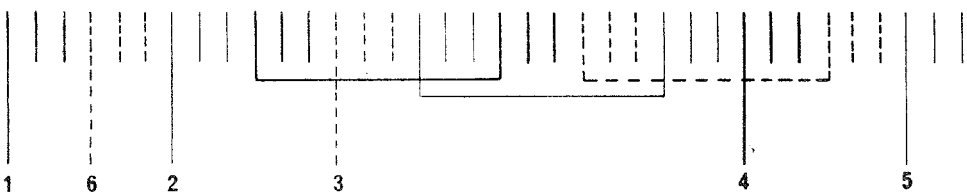
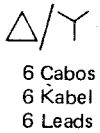
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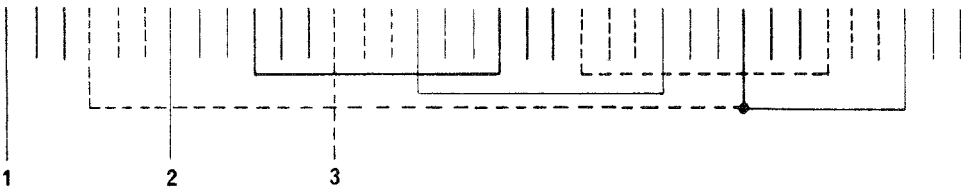
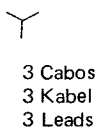
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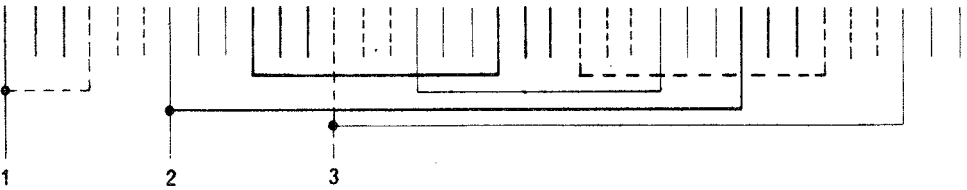
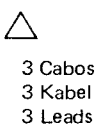
C



D



E



F

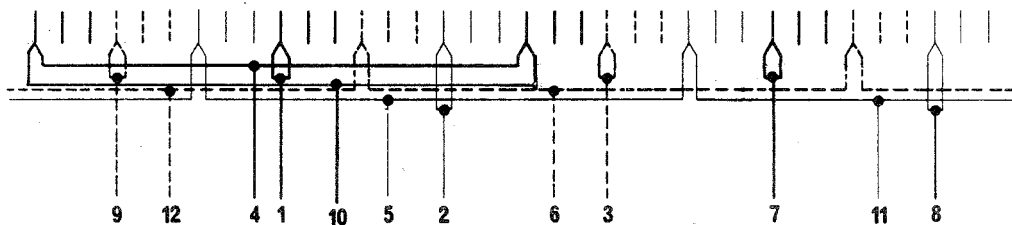
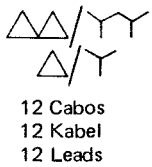
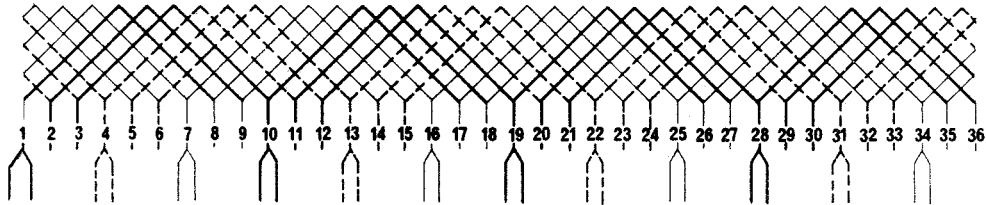
\*Nova nomenclatura



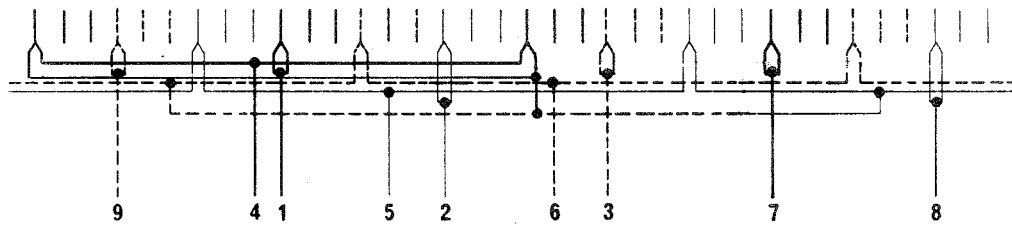
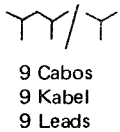
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 04 - 08/3  
(36-004-08/222-N)\*

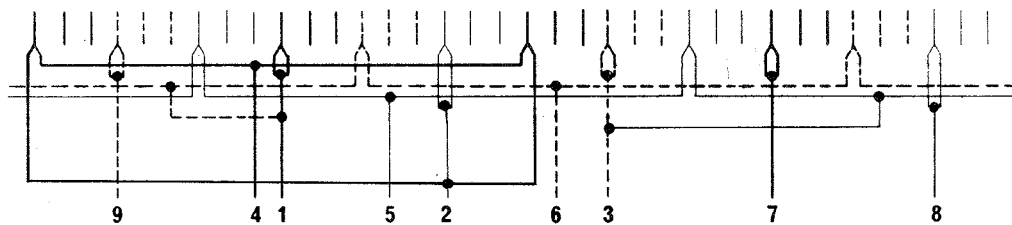
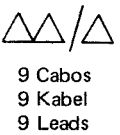
TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:8
DREHSTROM	36 NUTEN	4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:8
THREE-PHASE	36 SLOTS	4 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:8



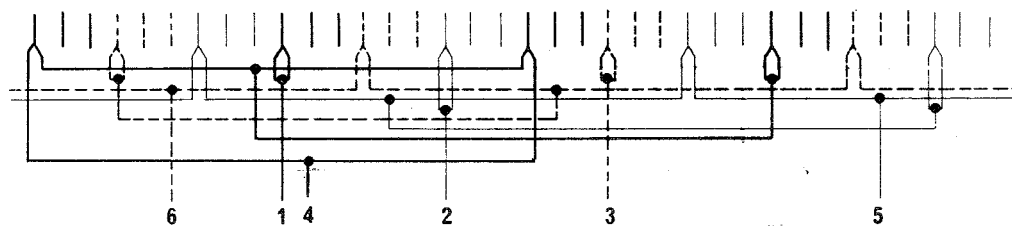
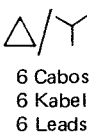
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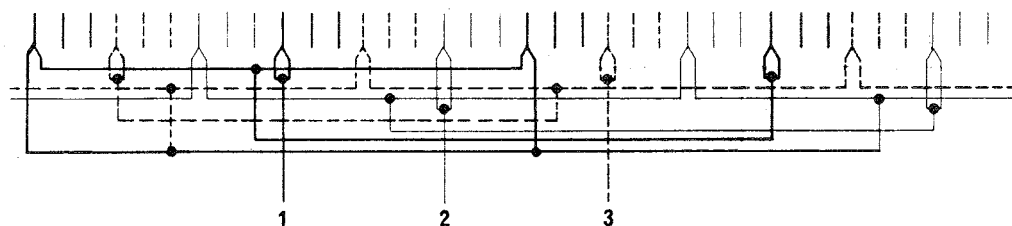
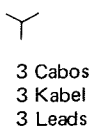
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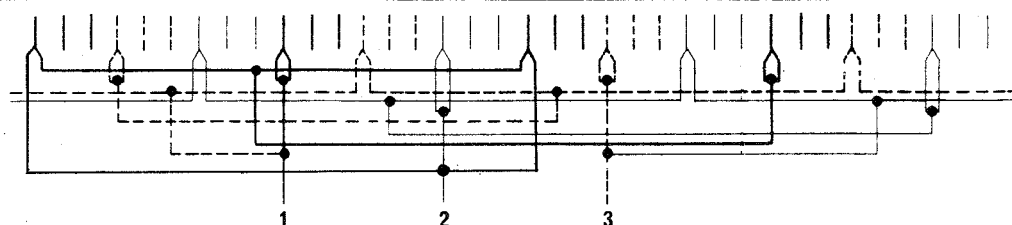
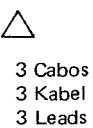
C



D



E



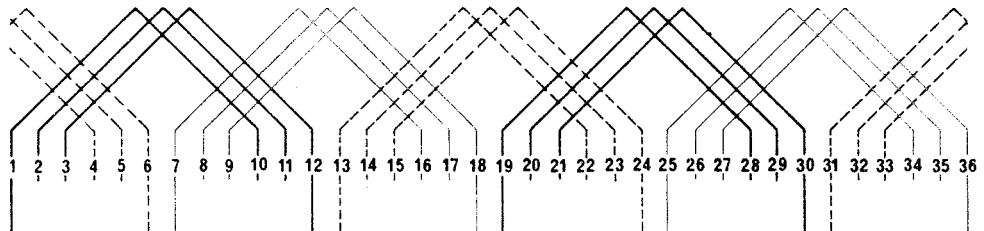
F

36 - 04 - 10/3  
(36-004-10/212-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	IMBRICADO PARALELO	PASSO 1:10
DREHSTROM	36 NUTEN	4 POLE	EINZEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:10
THREE-PHASE	36 SLOTS	4 POLES	SINGLE LAYER	PARALLEL LAP	PTICH 1:10



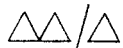
12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

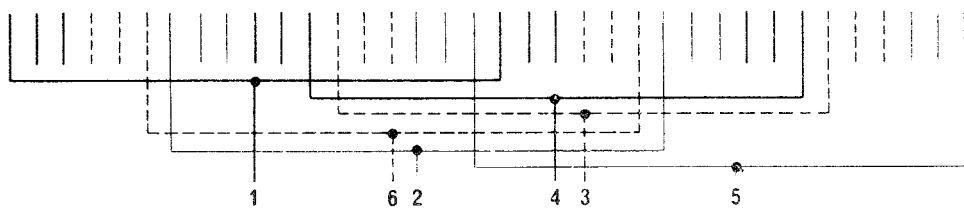


9 Cabos  
9 Kabel  
9 Leads

C



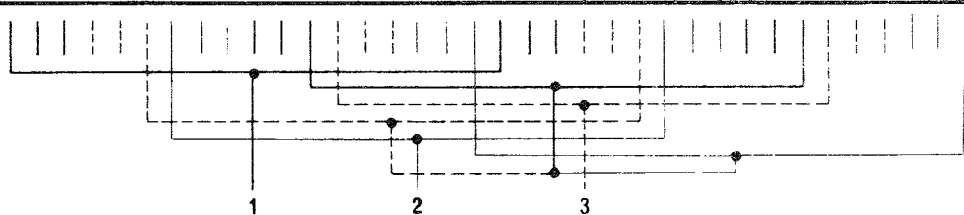
6 Cabos  
6 Kabel  
6 Leads



D



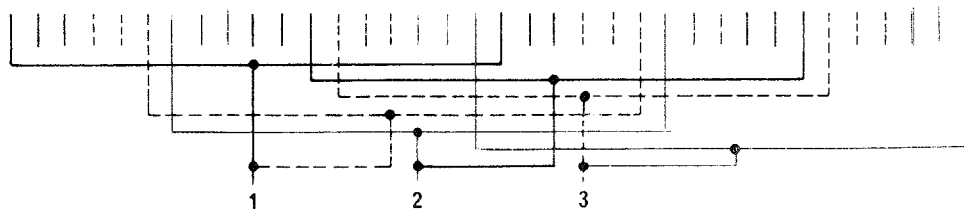
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

\*Nova nomenclatura

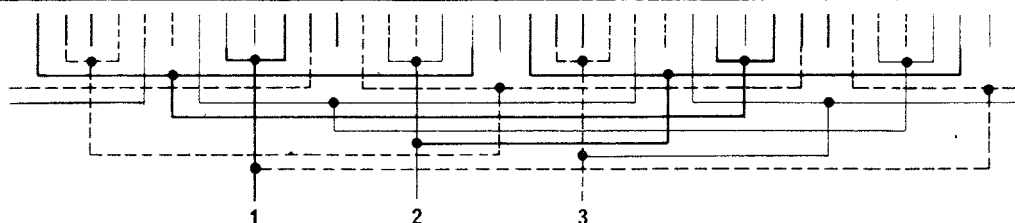
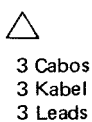
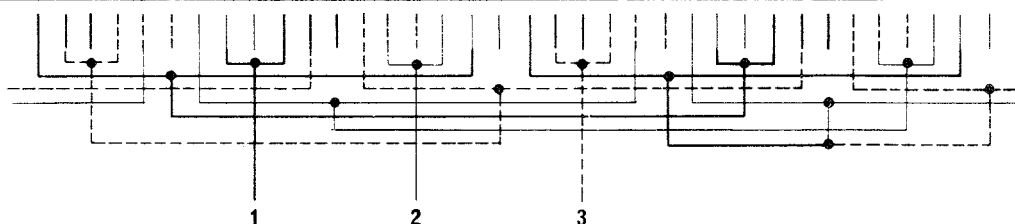
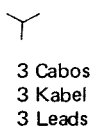
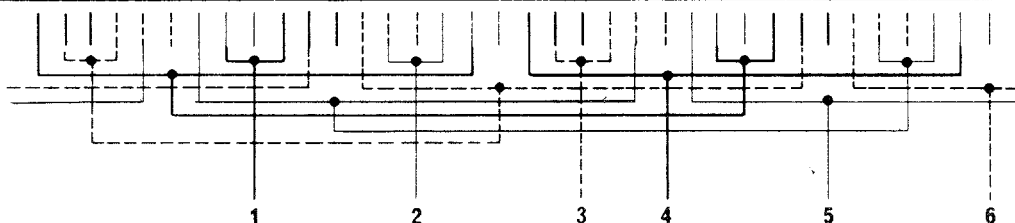
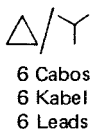
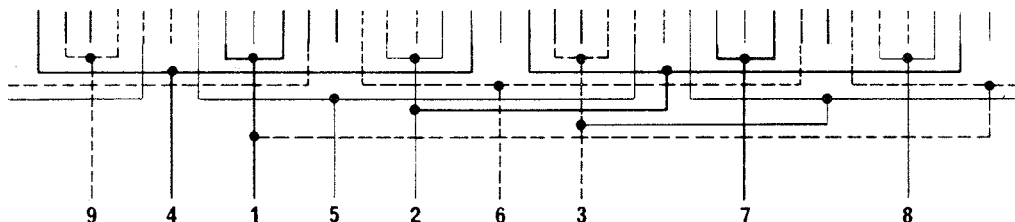
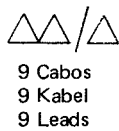
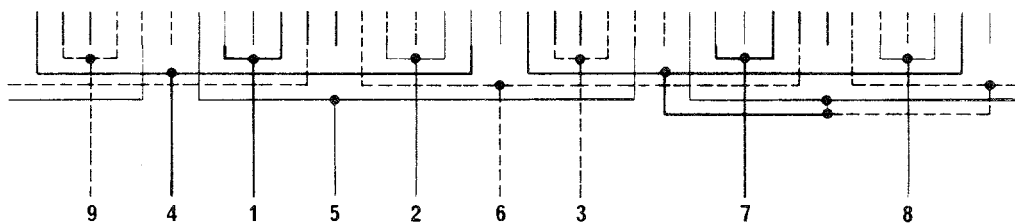
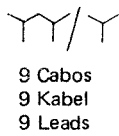
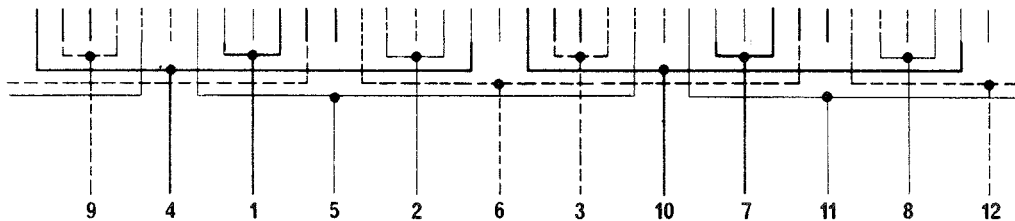
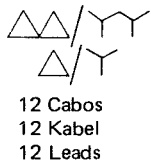
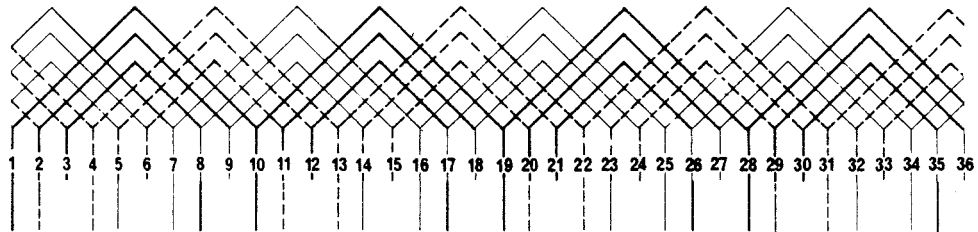




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 04 - 08/4  
(36-004-08/221-N)\*

TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:6:8:10
DREHSTROM	36 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	36 SLOTS	4 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:6:8:10

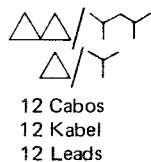
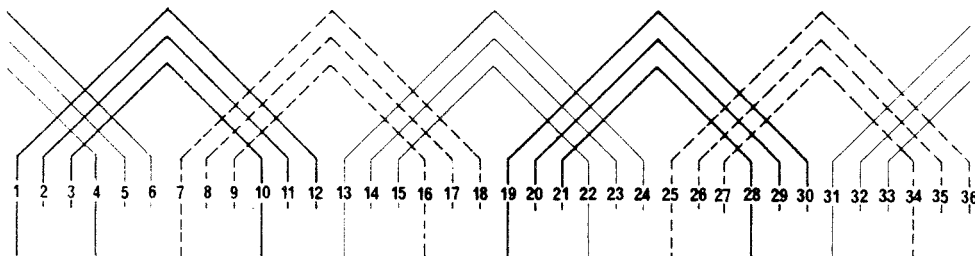


36 - 04 - 10/4  
(36-004-10/211-N)\*

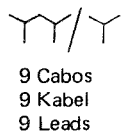
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



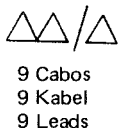
TRIFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	CONCÊNTRICO PARALELO	PASSO 1:8:10:12
DREHSTROM	36 NUTEN	4 POLE	EINZEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:8:10:12
THREE-PHASE	36 SLOTS	4 POLES	SINGLE LAYER	PARALLEL CONCENTRIC	PITCH 1:8:10:12



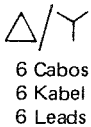
A



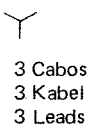
B



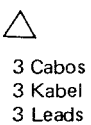
C



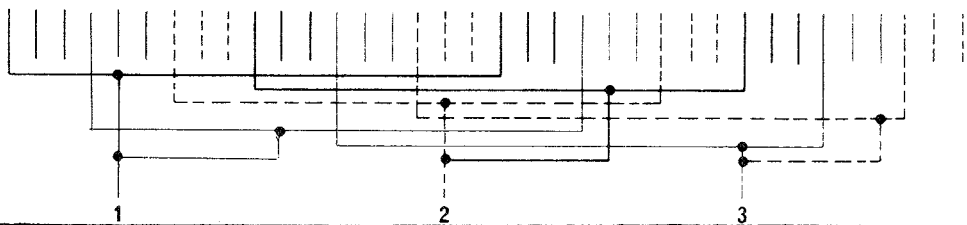
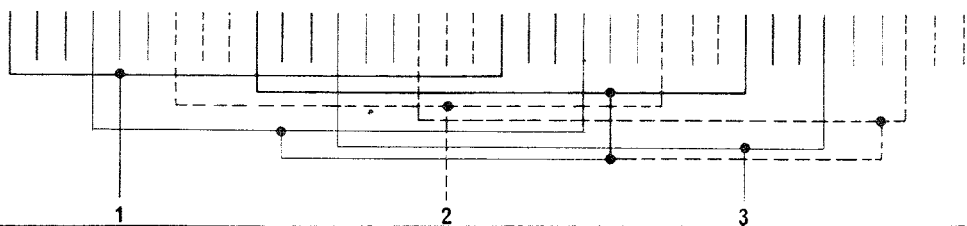
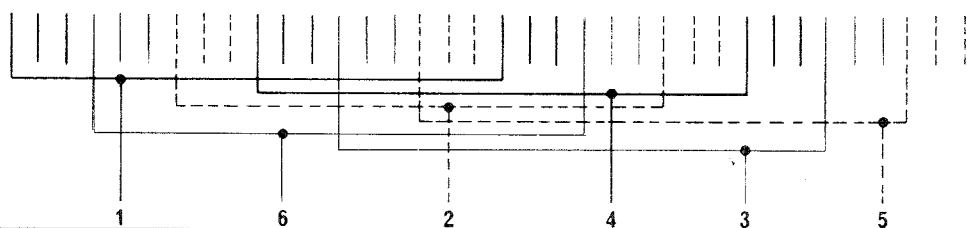
D



E



F



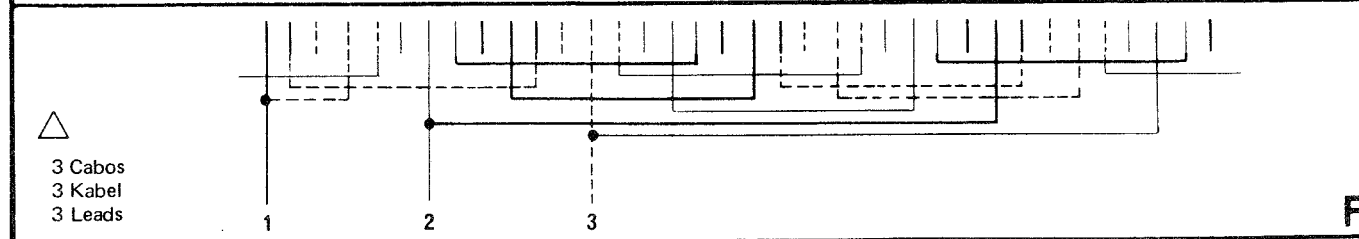
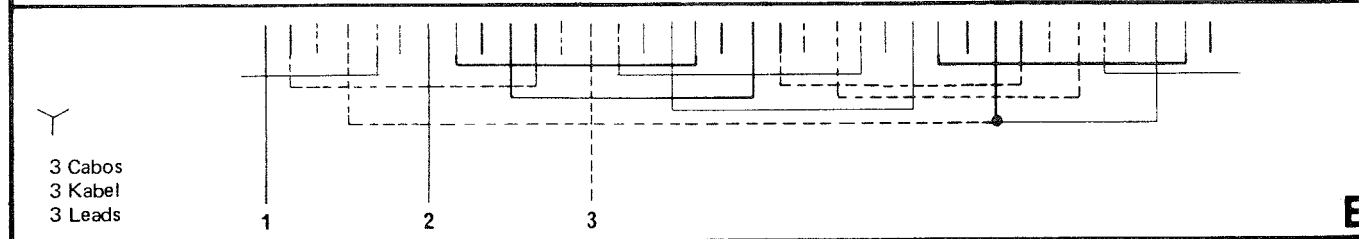
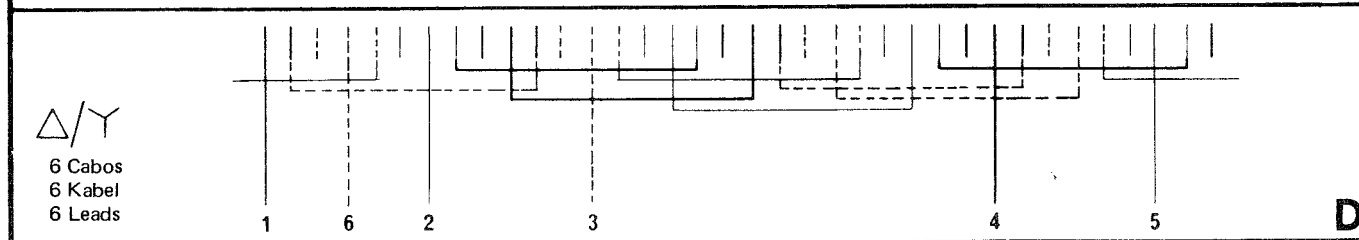
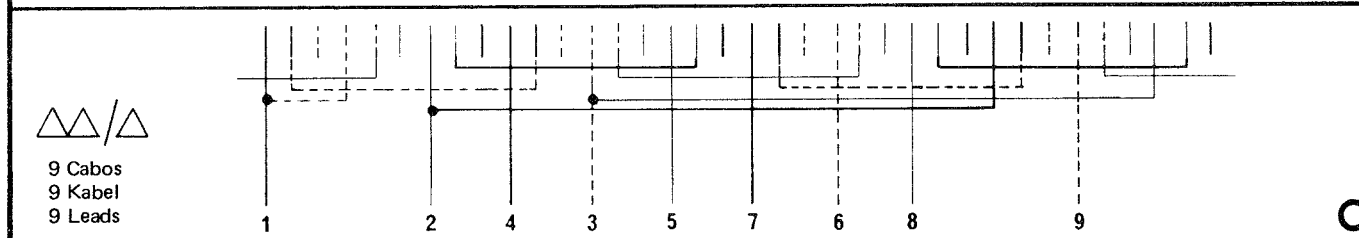
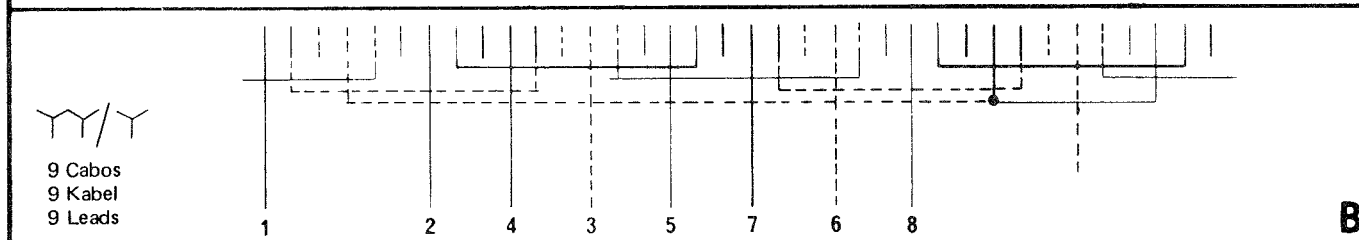
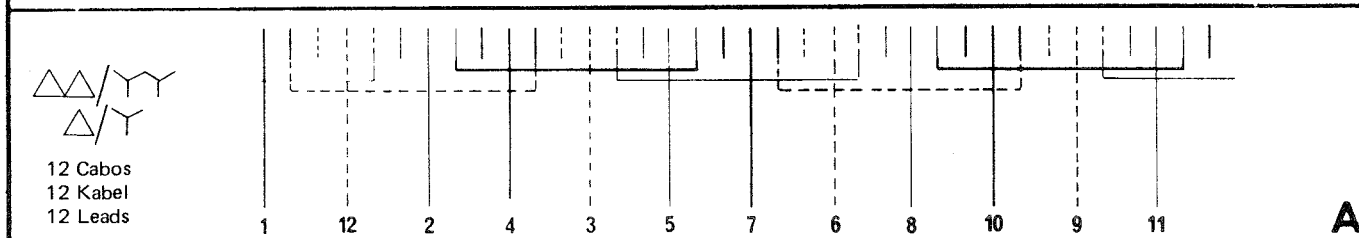
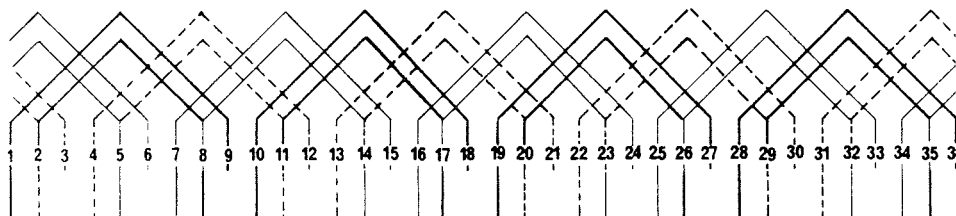
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 04 - 08/5  
(36-004-08/131-N)\*

TRIFÁSICO	36 RANHURAS	4 POLOS	MISTO	CONCÊNTRICO SÉRIE	PASSO 1:7:9
DREHSTROM	36 NUTEN	4 POLE	EINZEL- UND/ ODER DOPPEL- SCHICHT	KONZENTRISCHE SERIE	WICKEL- SCHRITT 1:7:9
THREE-PHASE	36 SLOTS	4 POLES	SINGLE AND TWO LAYER	SERIES CONCENTRIC	PITCH 1:7:9

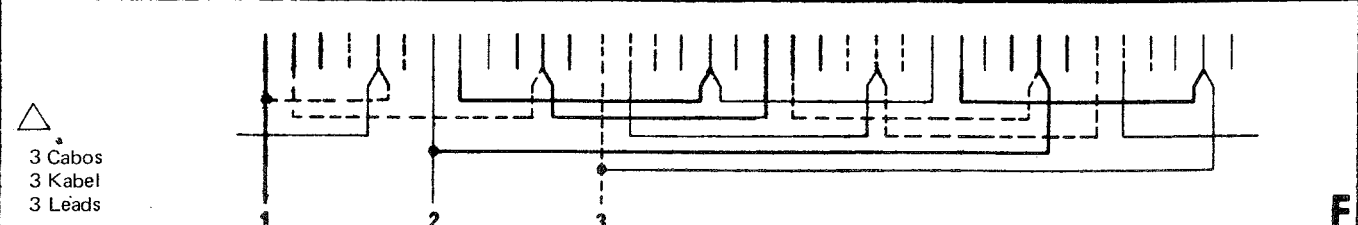
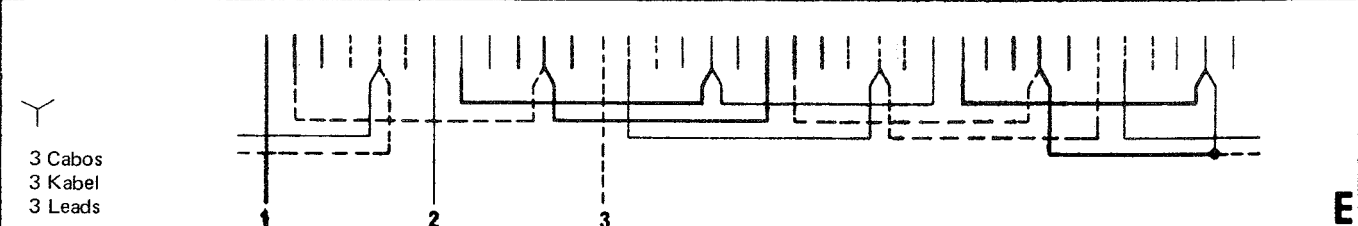
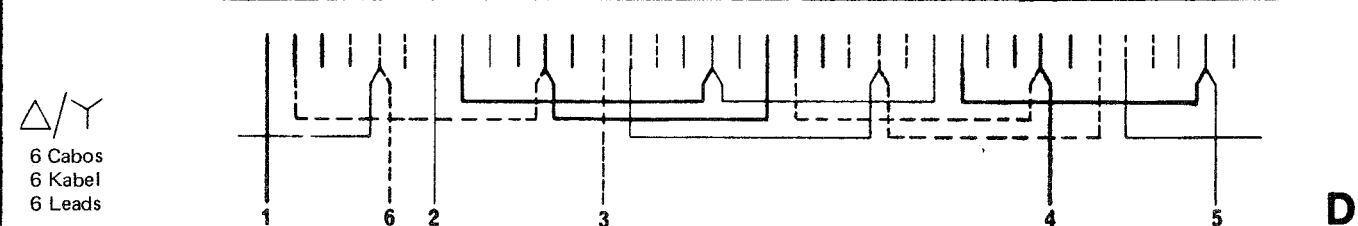
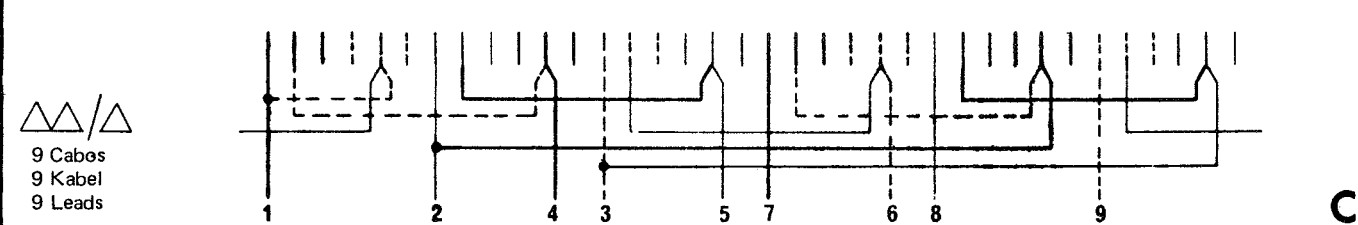
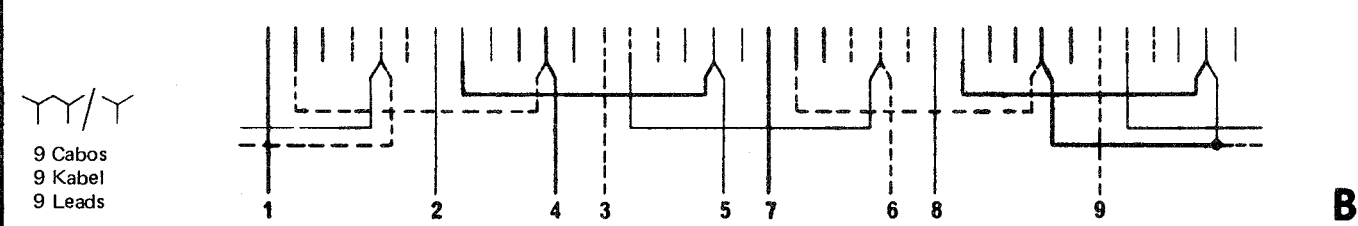
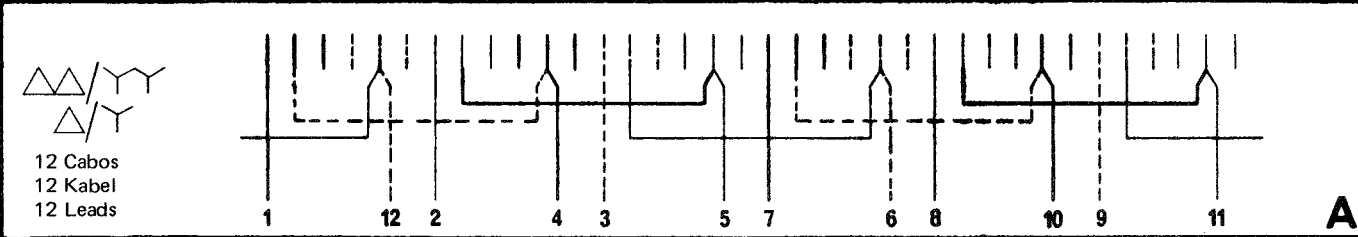
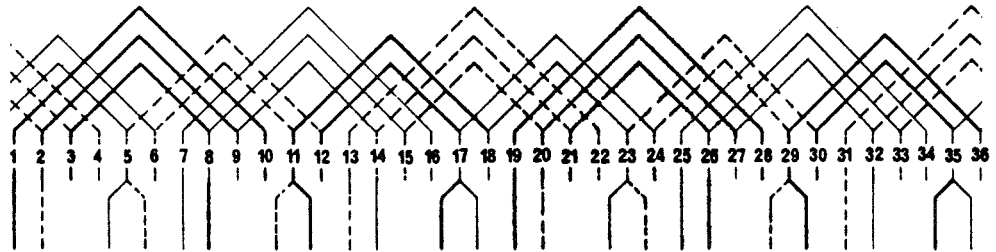


36 - 04 - 08/6  
(36-004-75/131-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	4 POLOS	MISTO	CONCÊNTRICO SÉRIE	PASSO 1:6:8
DREHSTROM	36 NUTEN	4 POLE	EINZEL- UND/ ODER DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:6:8
THREE-PHASE	36 SLOTS	4 POLES	SINGLE AND TWO LAYER	SERIES CONCENTRIC	PITCH 1:6:8



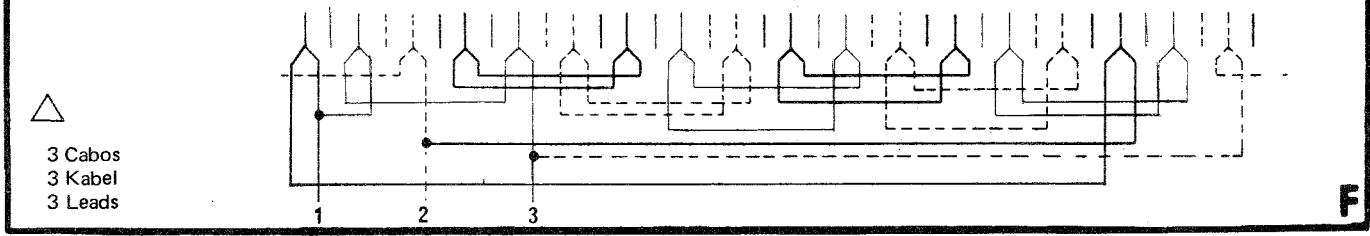
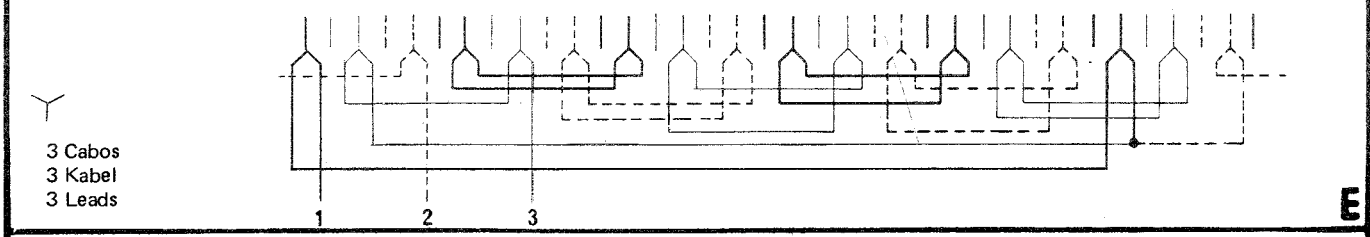
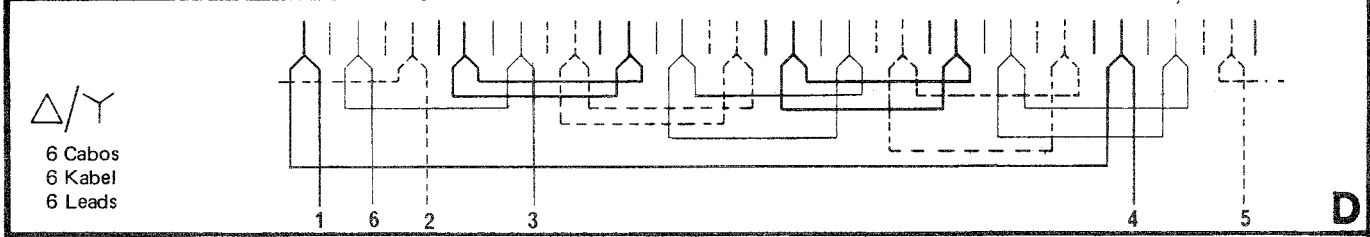
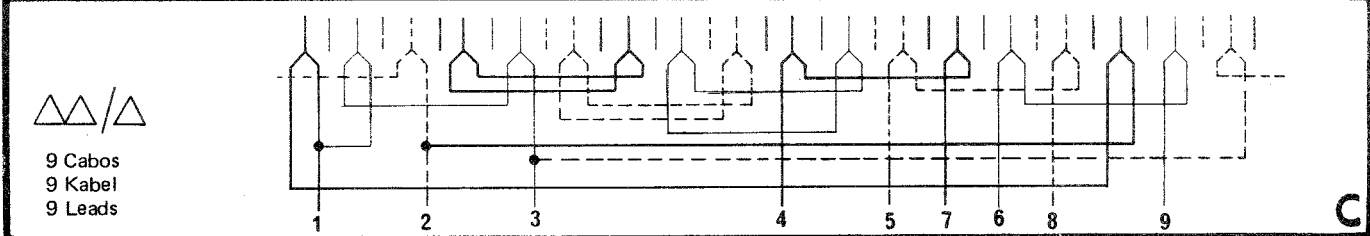
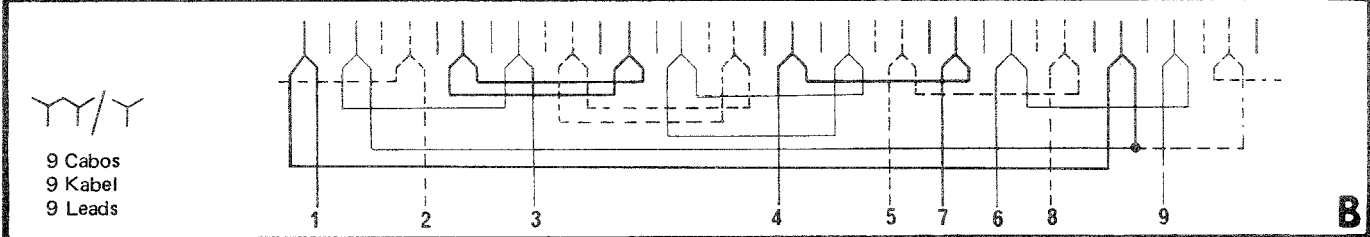
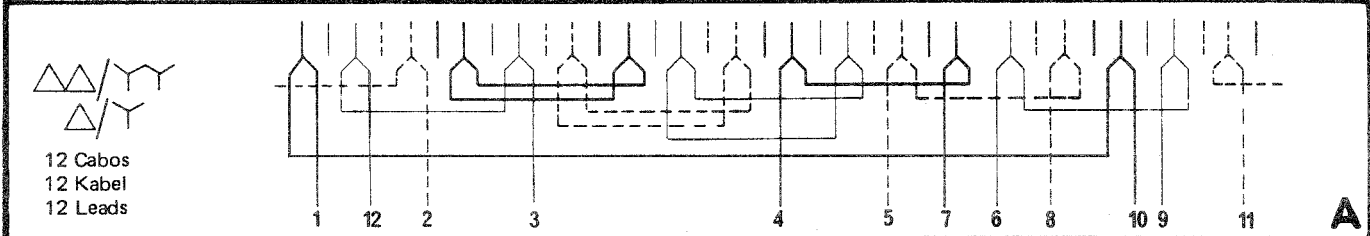
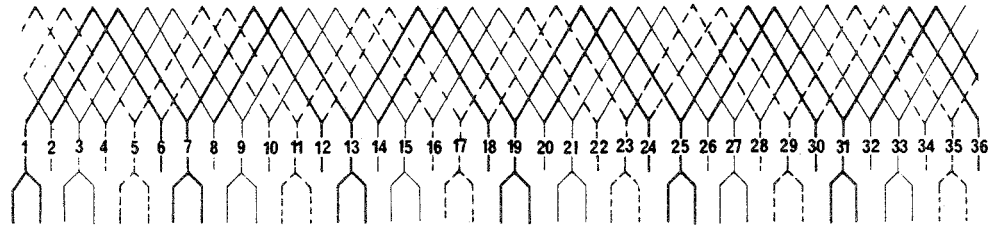
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 06/1  
(36-006-06/122-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:6
DREHSTROM	36 NUTEN	6 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	6 POLES	TWO LAYER	SERIES LAP	PITCH 1:6



36 - 06 - 07/1  
(36-006-07/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

36 RANHURAS

6 POLOS

CAMADA  
DUPLA

IMBRICADO  
SÉRIE

PASSO 1:7

DREHSTROM

36 NUTEN

6 POLE

DOPPEL-  
SCHICHT

TRÄUFEL-  
WICKLUNG  
SERIE

WICKEL-  
SCHRITT 1:7

THREE-PHASE

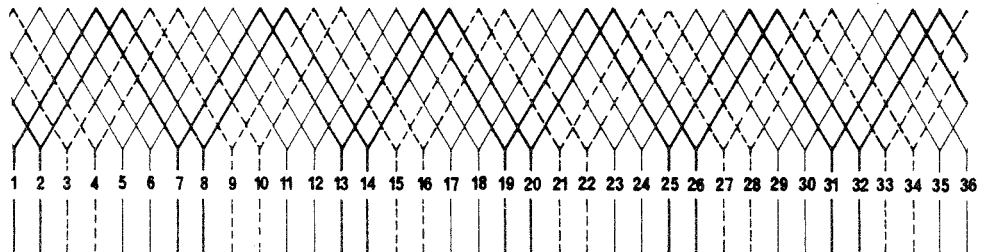
36 SLOTS

6 POLES

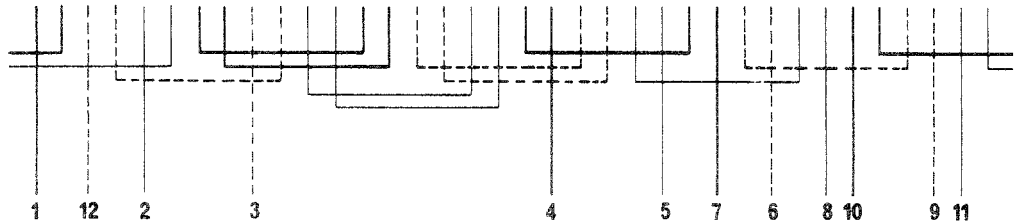
TWO LAYER

SERIES LAP

PITCH 1:7



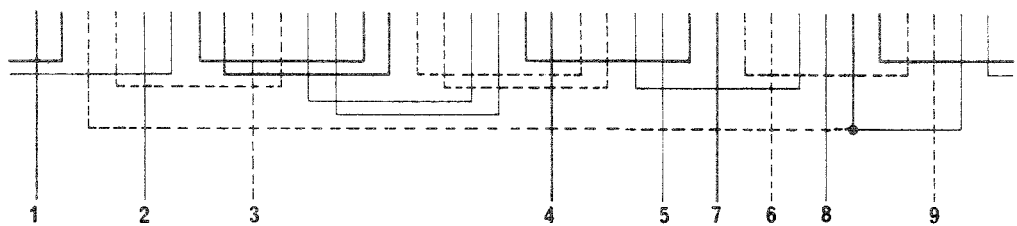
12 Cabos  
12 Kabel  
12 Leads



A



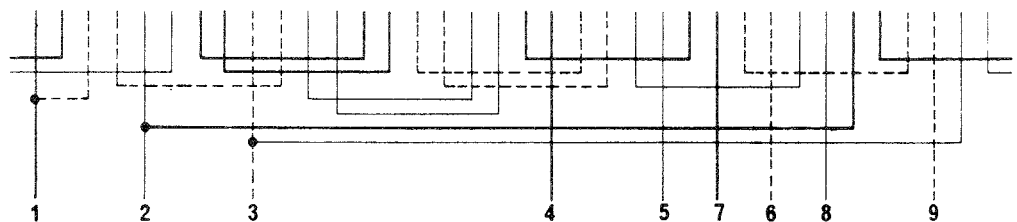
9 Cabos  
9 Kabel  
9 Leads



B



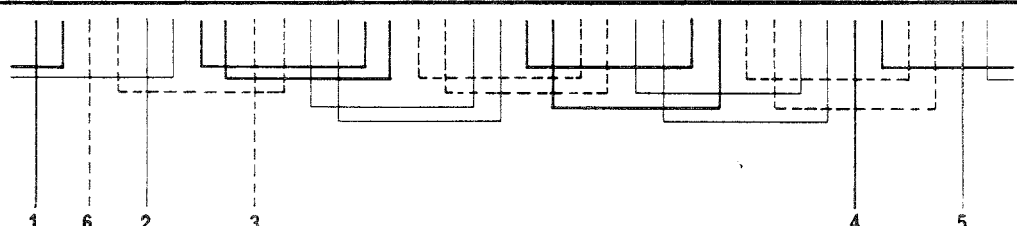
9 Cabos  
9 Kabel  
9 Leads



C



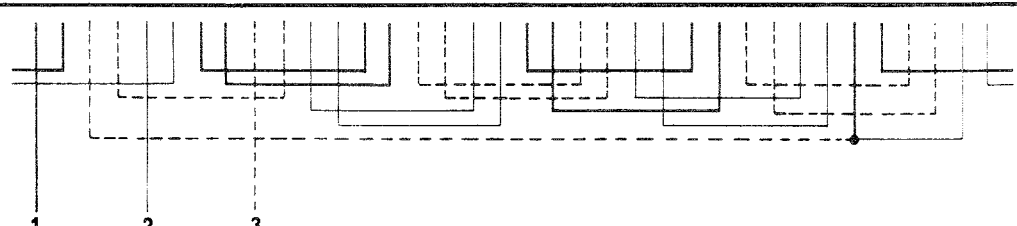
6 Cabos  
6 Kabel  
6 Leads



D



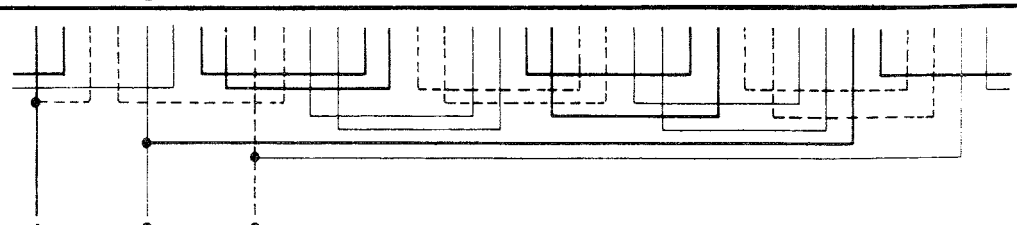
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

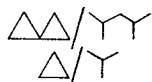
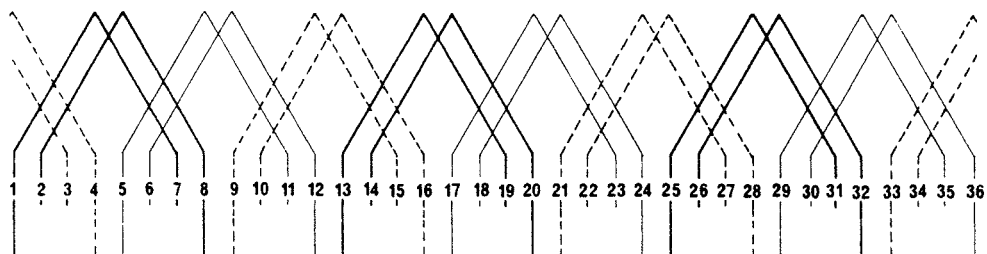
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 07/2  
(36-006-07/112-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:7
DREHSTROM	36 NUTEN	6 POLE	EINZEL-SCHICHT	TRÄUFEL-WICKLUNG SERIE	WICKEL SCHRITT 1:7
THREE-PHASE	36 SLOTS	6 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:7



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

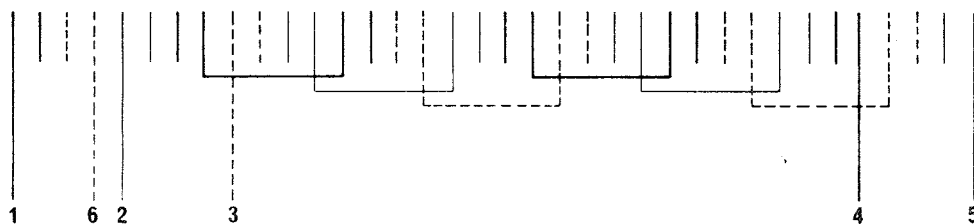


9 Cabos  
9 Kabel  
9 Leads

C



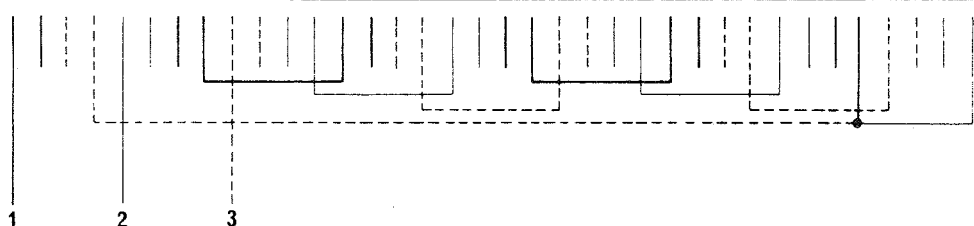
6 Cabos  
6 Kabel  
6 Leads



D



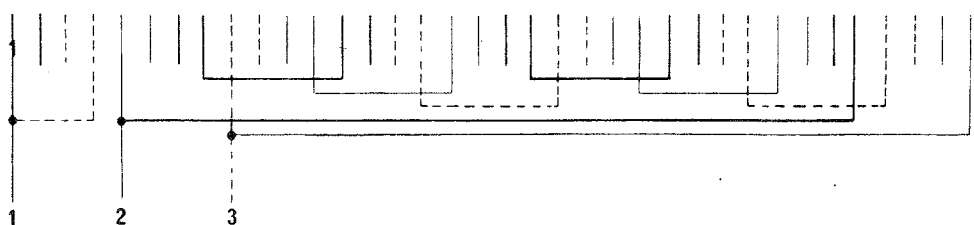
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

36 - 06 - 06/2  
(36-006-06/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

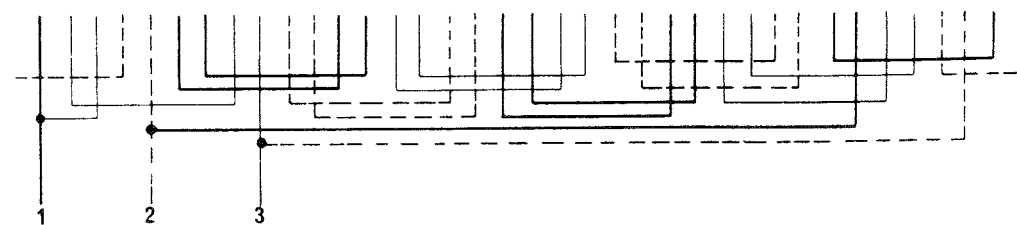
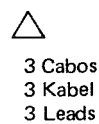
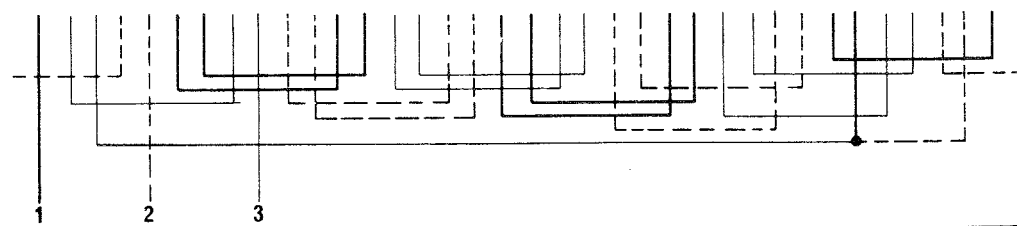
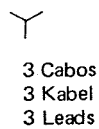
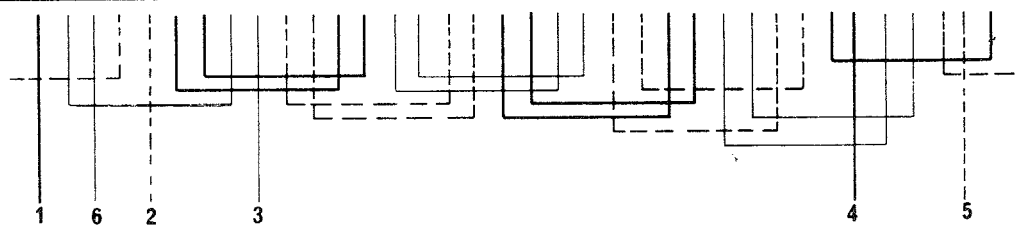
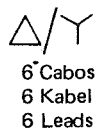
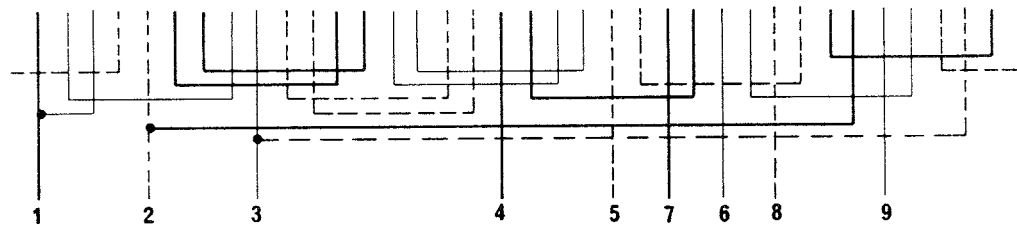
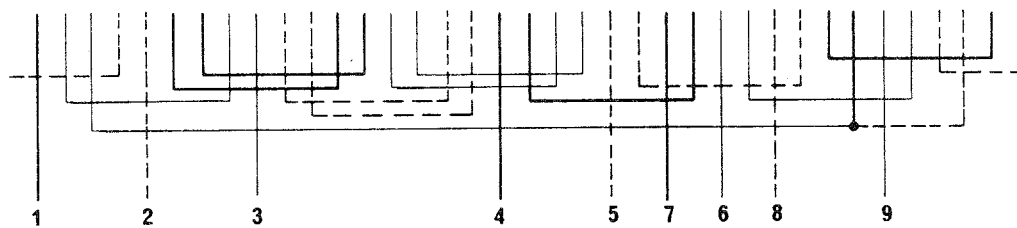
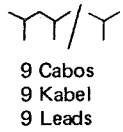
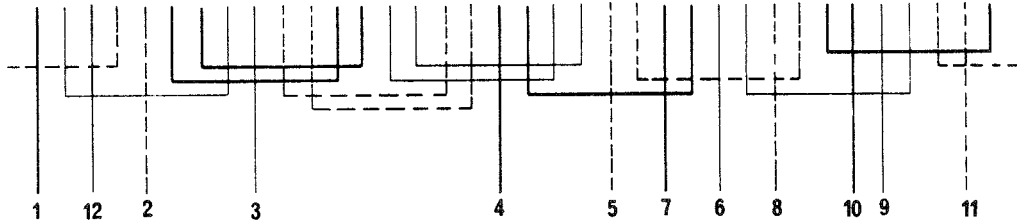
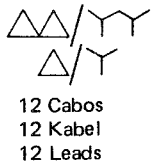
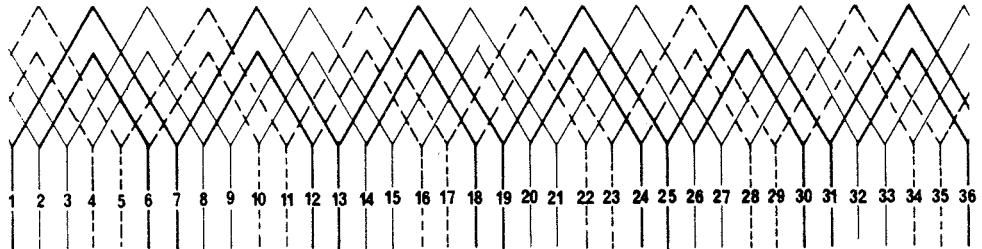
36 RANHURAS  
36 NUTEN  
36 SLOTS

6 POLOS  
6 POLE  
6 POLES

CAMADA  
DUPLA  
DOPPEL-  
SCHICHT  
TWO LAYER

CONCÊNTRICO  
SÉRIE  
KONZENTRISCHE  
SERIE  
SERIES  
CONCENTRIC

PASSO 15:7  
WICKEL-  
SCHRITT 1:5:7  
PITCH 1:5:7



\*Nova nomenclatura

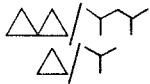
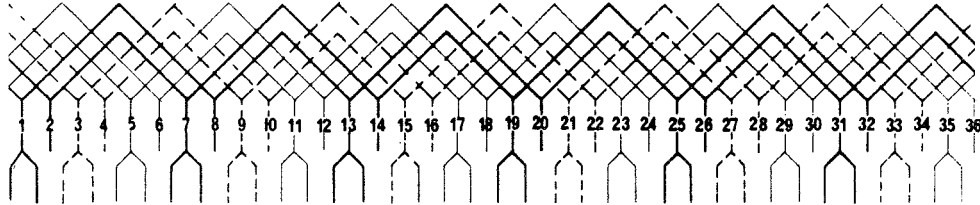




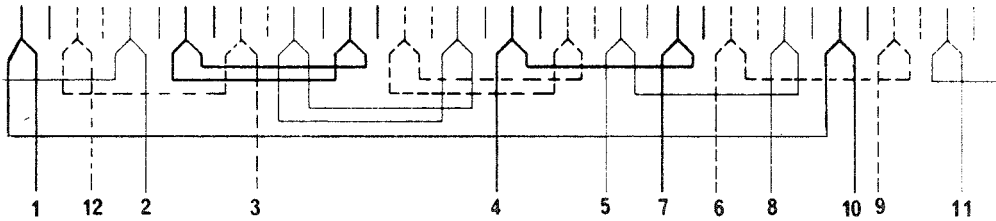
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 07/3  
(36-006-07/121-N)\*

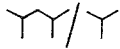
TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:6:8
DREHSTROM	36 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SERIE	WICKEL-SCHRITT 1:6:8
THREE-PHASE	36 SLOTS	6 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:6:8



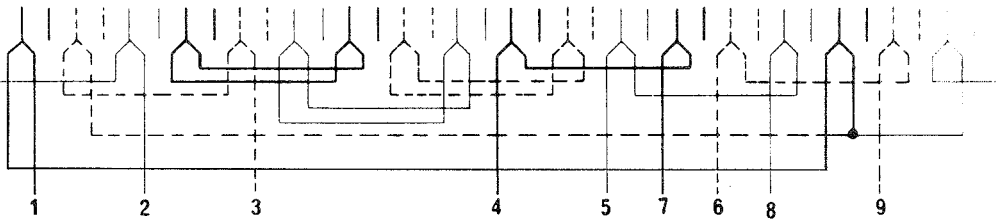
12 Cabos  
12 Kabel  
12 Leads



A



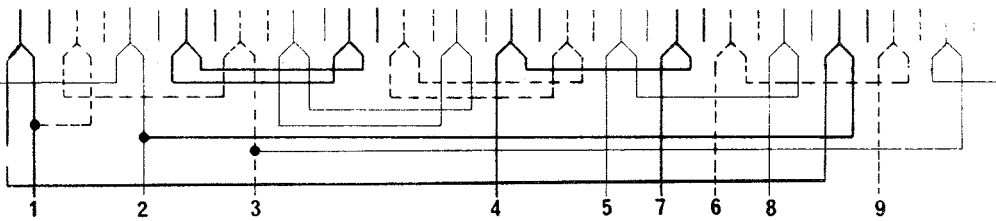
9 Cabos  
9 Kabel  
9 Leads



B



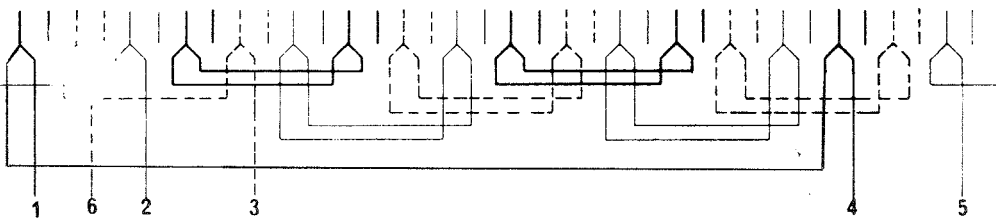
9 Cabos  
9 Kabel  
9 Leads



C



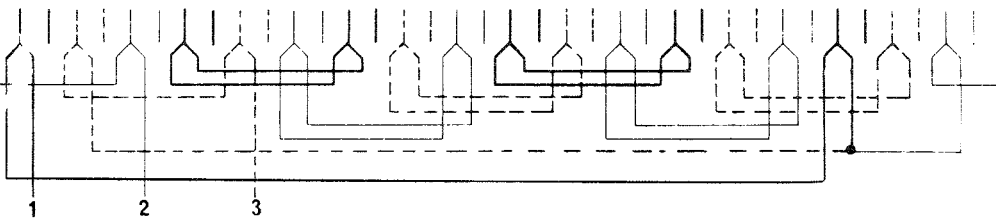
6 Cabos  
6 Kabel  
6 Leads



D



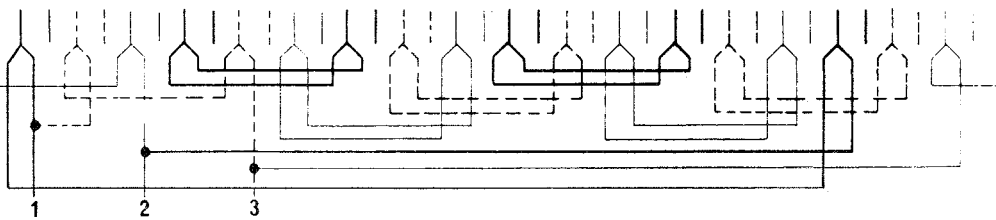
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

36 - 06 - 07/4  
(36-006-07/111-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

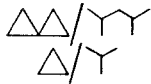
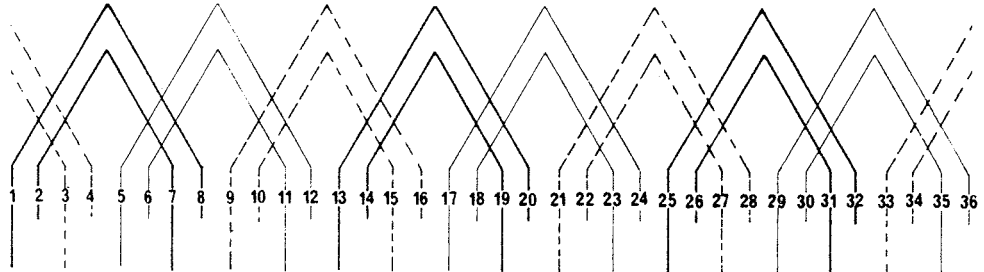
36 RANHURAS  
36 NUTEN  
36 SLOTS

6 POLOS  
6 POLE  
6 POLES

CAMADA ÚNICA  
EINZEL-SCHICHT  
SINGLE LAYER

CONCÊNTRICO SÉRIE  
KONZENTRISCHE SÉRIE  
SERIES CONCENTRIC

PASSO 1:6:8  
WICKEL-SCHRITT 1:6:8  
PITCH 1:6:8



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

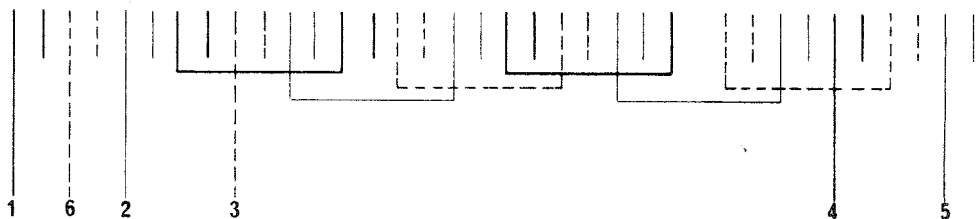


9 Cabos  
9 Kabel  
9 Leads

C



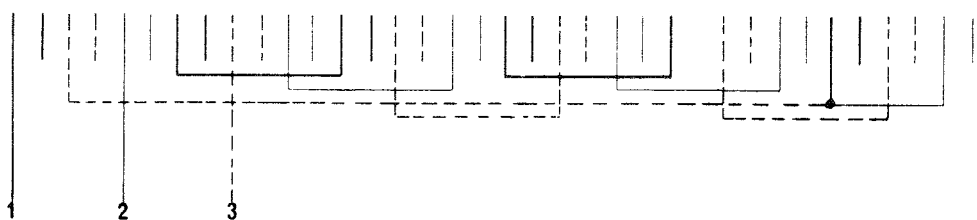
6 Cabos  
6 Kabel  
6 Leads



D



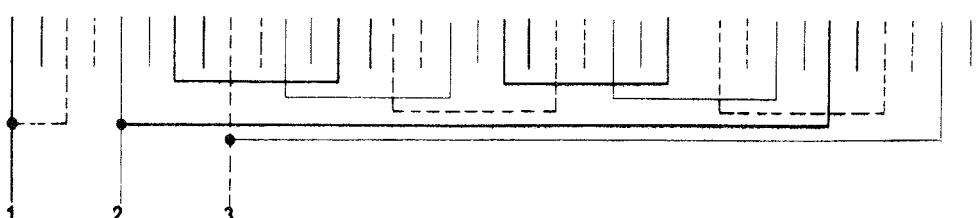
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

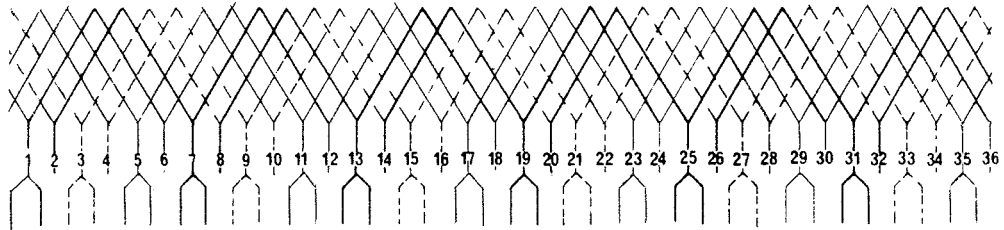
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

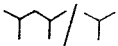
36 - 06 - 06/3  
(36-006-06/222-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:6
DREHSTROM	36 NUTEN	6 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	6 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:6



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

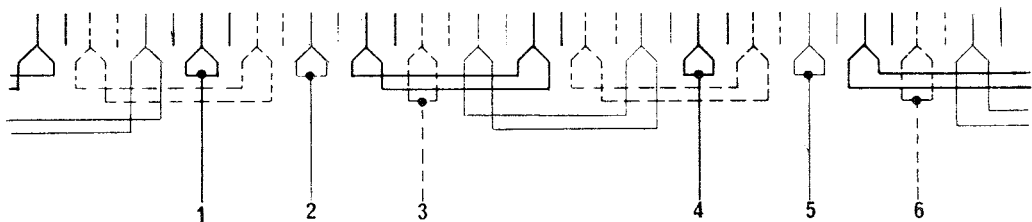


9 Cabos  
9 Kabel  
9 Leads

C



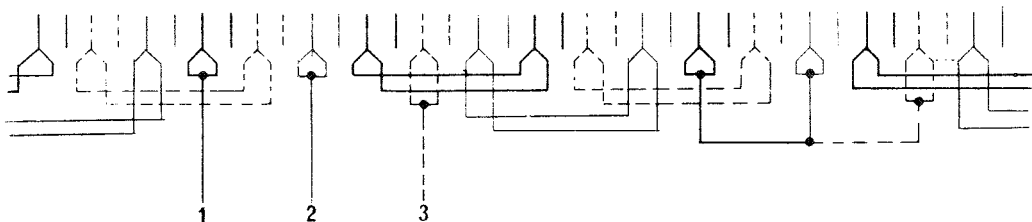
6 Cabos  
6 Kabel  
6 Leads



D



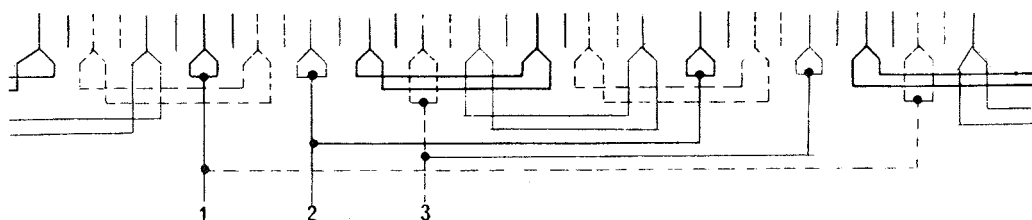
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

36 - 06 - 07/5  
(36-006-07/222-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

36 RANHURAS

6 POLOS

CAMADA  
DUPLA

IMBRICADO  
PARALELO

PASSO 1:7

DREHSTROM

36 NUTEN

6 POLE

DOPPEL-  
SCHICHT

TRÄUFEL-  
WICKLUNG  
PARALLEL

WICKEL-  
SCHRITT 1:7

THREE-PHASE

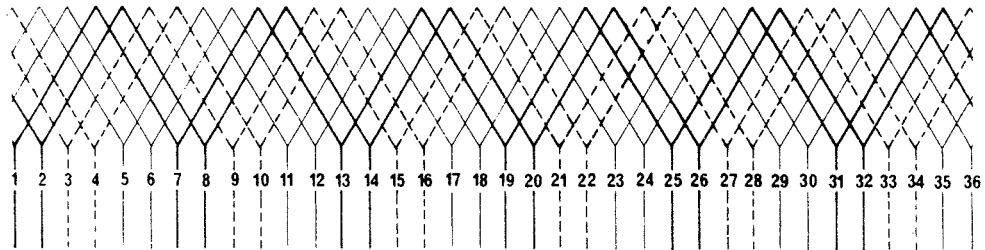
36 SLOTS

6 POLES

TWO LAYER

PARALLEL LAP

PITCH 1:7



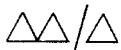
12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

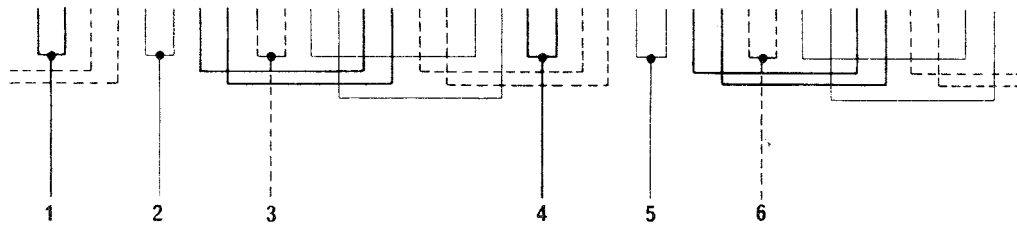


9 Cabos  
9 Kabel  
9 Leads

C



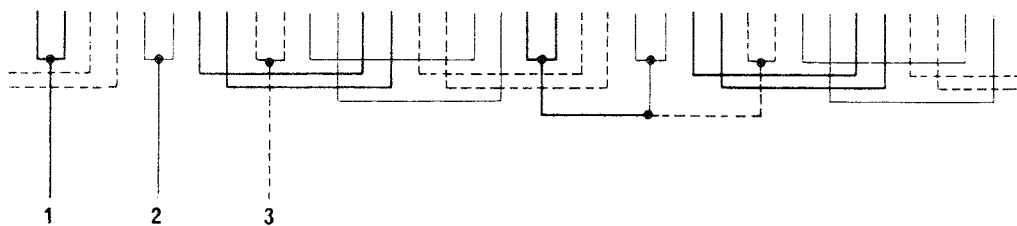
6 Cabos  
6 Kabel  
6 Leads



D



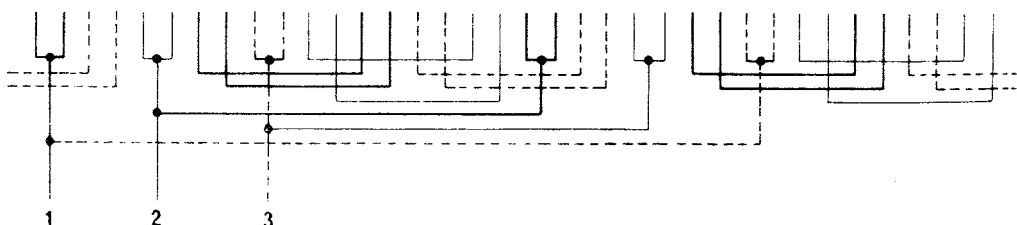
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

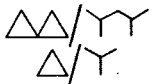
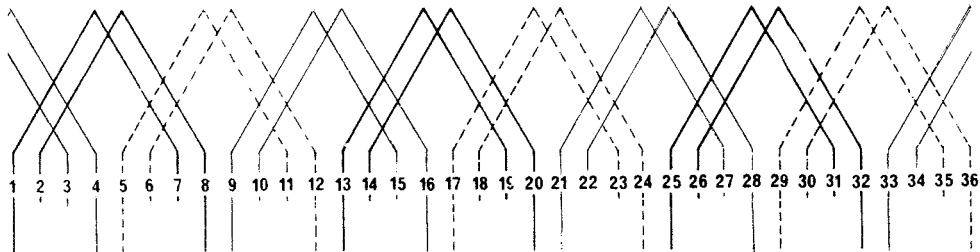
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 07/6  
(36-006-07/312-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA ÚNICA	IMBRICADO 3 x PARALELO	PASSO 1:7
DREHSTROM	36 NUTEN	6 POLE	EINZEL- SCHICHT	TRÄUFEL- WICKLUNG 3 x PARALLEL	WICKEL- SCHRITT 1:7
THREE-PHASE	36 SLOTS	6 POLES	SINGLE LAYER	LAP 3 x PARALLEL	PITCH 1:7



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B



9 Cabos  
9 Kabel  
9 Leads

C



6 Cabos  
6 Kabel  
6 Leads

D



3 Cabos  
3 Kabel  
3 Leads

E



3 Cabos  
3 Kabel  
3 Leads

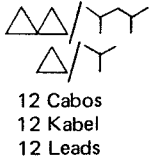
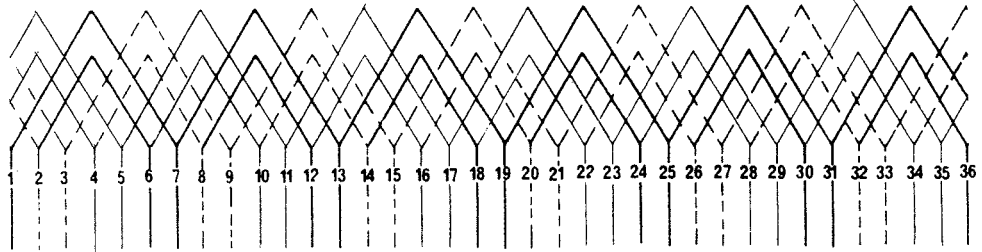
F

36 - 06 - 06/4  
(36-006-06/221-N)\*

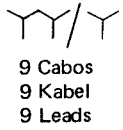
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



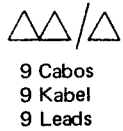
TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:5:7
DREHSTROM	36 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:5:7
THREE-PHASE	36 SLOTS	6 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:5:7



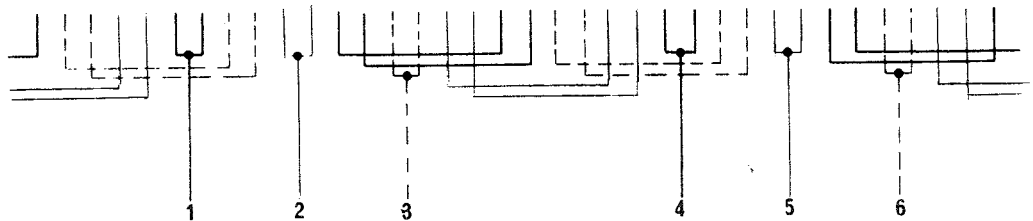
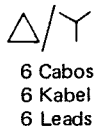
A



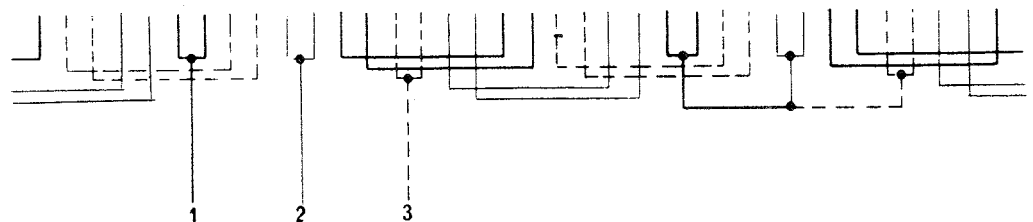
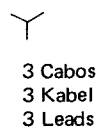
B



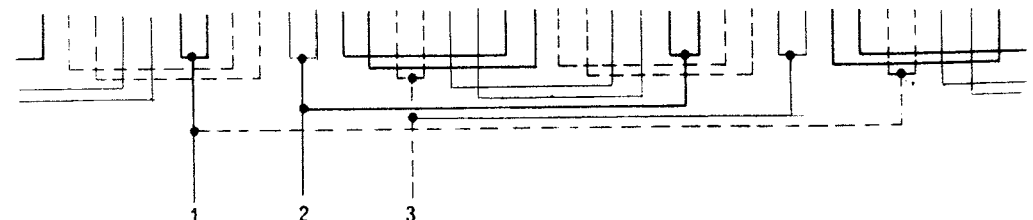
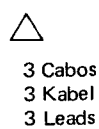
C



D



E



F

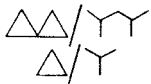
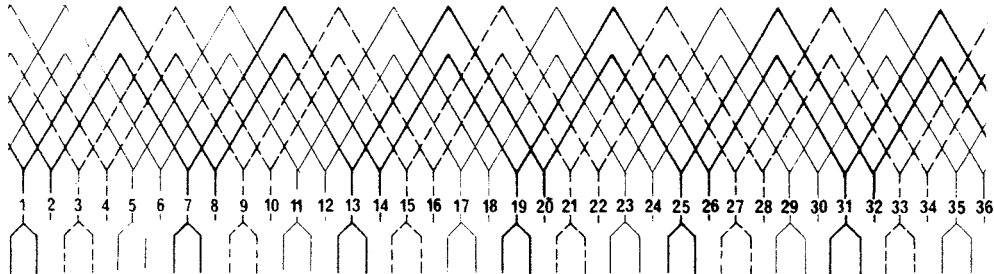
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 07/7  
(36-006-07/221-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:6:8
DREHSTROM	36 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:6:8
THREE-PHASE	36 SLOTS	6 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:6:8



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

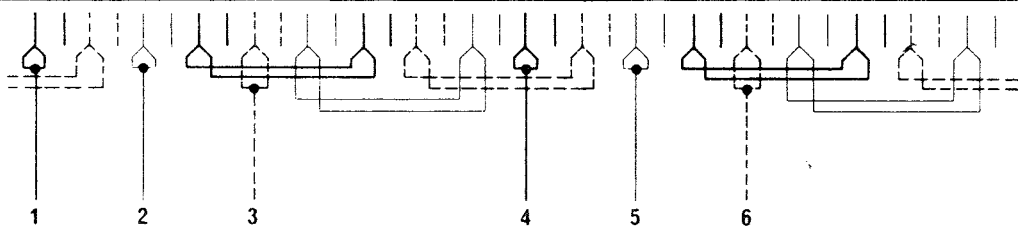


9 Cabos  
9 Kabel  
9 Leads

C



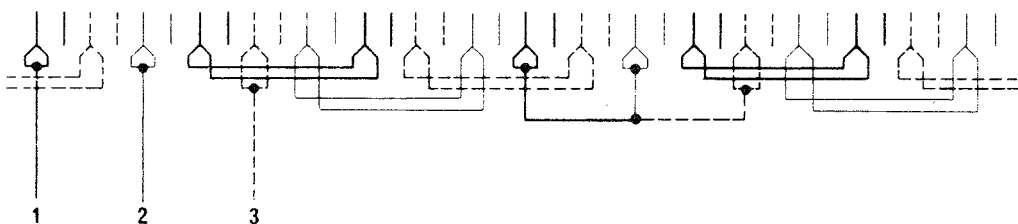
6 Cabos  
6 Kabel  
6 Leads



D



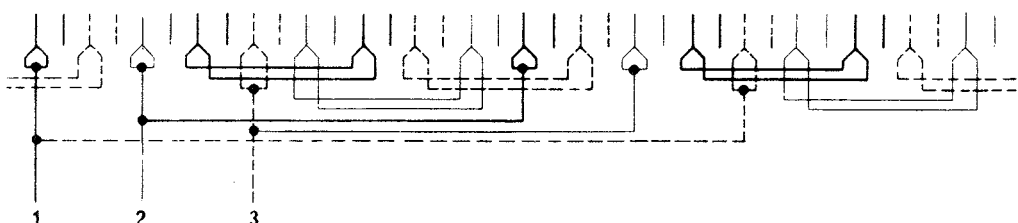
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



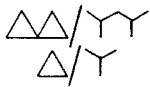
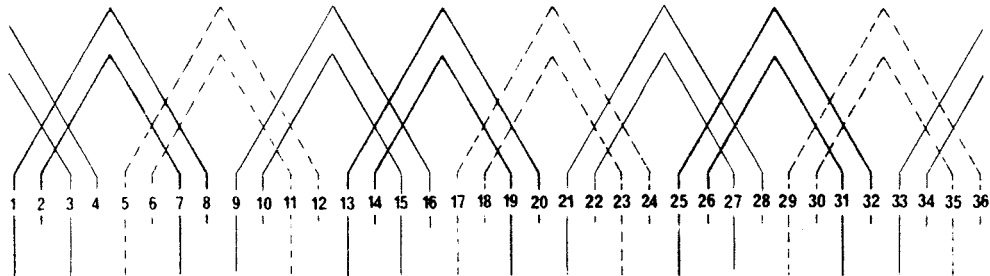
F

36 - 06 - 07/8  
(36-006-07/311-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA ÚNICA	CONCÊNTRICO 3 x PARALELO	PASSO 1:6:8
DREHSTROM	36 NUTEN	6 POLE	EINZEL- SCHICHT	KONZENTRISCHE 3 x PARALLEL	WICKEL- SCHRITT 1:6:8
THREE-PHASE	36 SLOTS	6 POLES	SINGLE LAYER	CONCENTRIC 3 x PARALLEL	PITCH 1:6:8



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

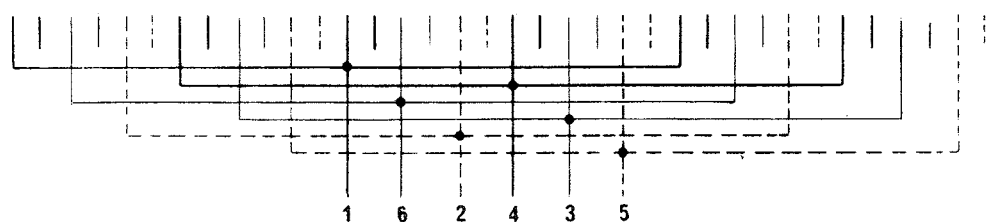


9 Cabos  
9 Kabel  
9 Leads

C



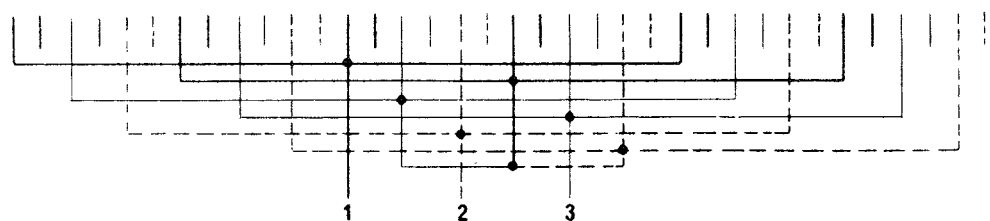
6 Cabos  
6 Kabel  
6 Leads



D



3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

\*Nova nomenclatura

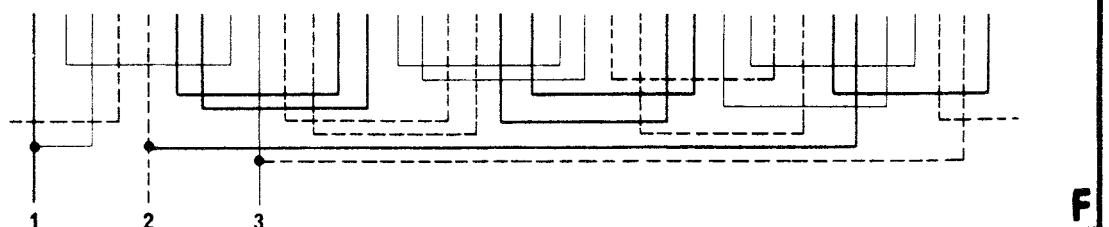
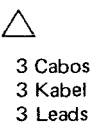
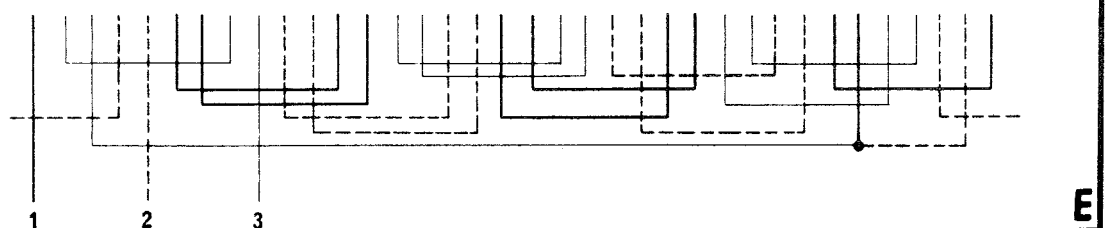
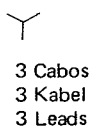
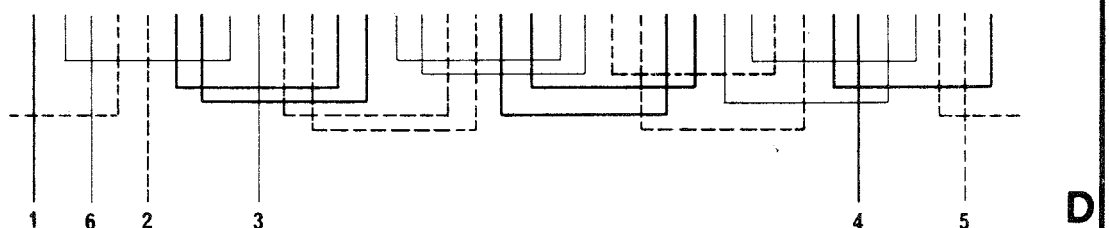
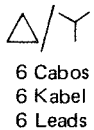
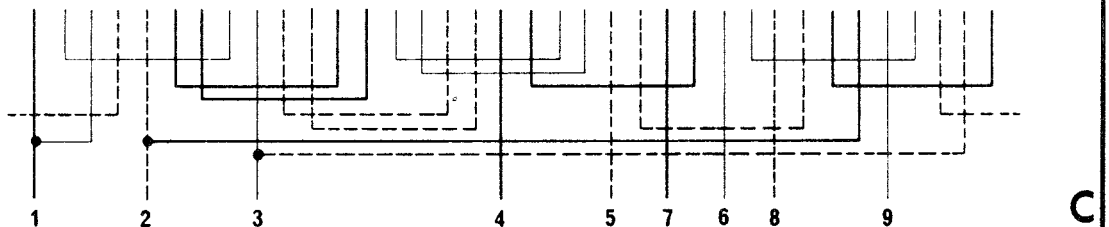
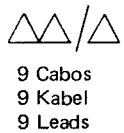
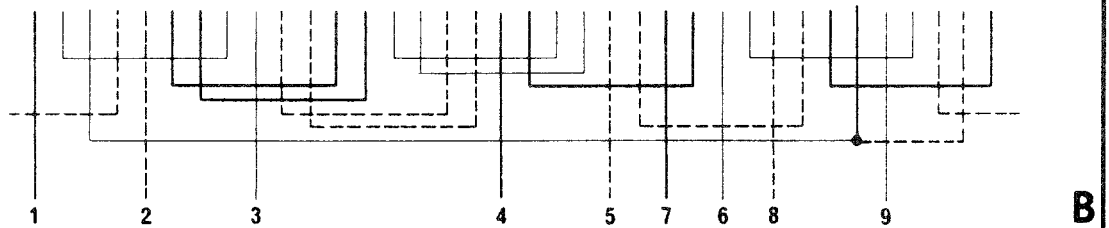
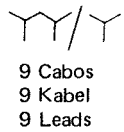
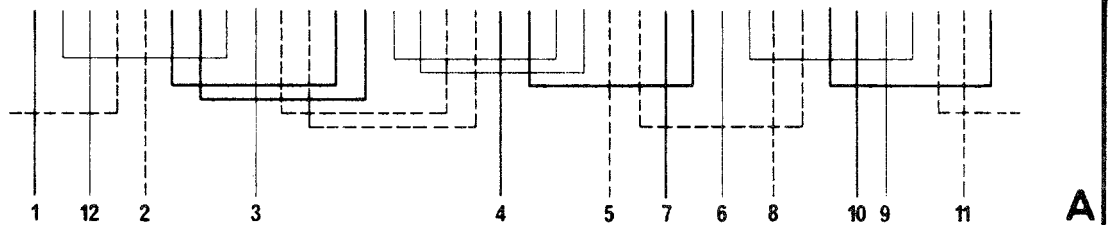
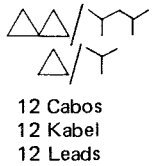
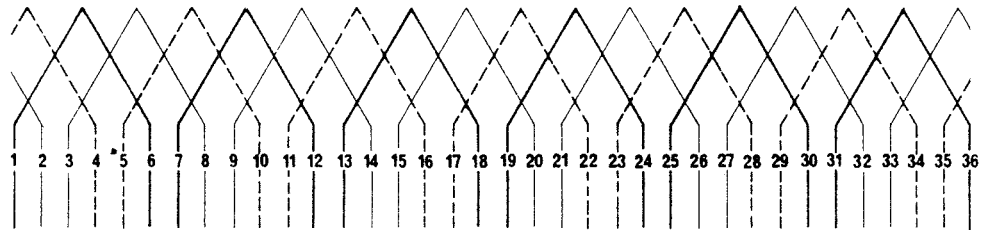




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 06 - 06/5  
(36-006-06/112-N)\*

TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:6
DREHSTROM	36 NUTEN	6 POLE	EINZEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	6 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:6

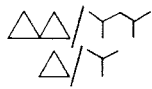
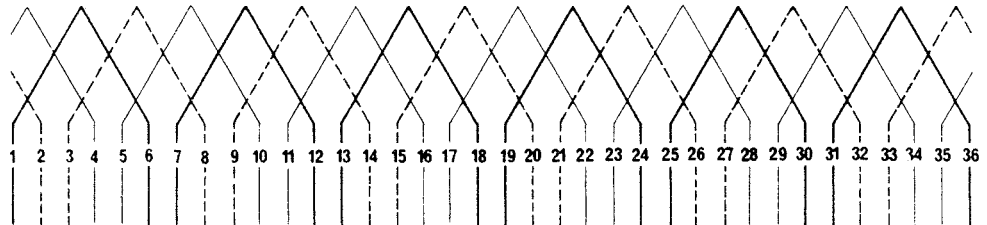


36 - 06 - 06/6  
(36-006-06/212-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	6 POLOS	CAMADA ÚNICA	IMBRICADO PARALELO	PASSO 1:6
DREHSTROM	36 NUTEN	6 POLE	EINZEL-SCHICHT	TRAUFEWICKLUNG PARALLEL	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	6 POLES	SINGLE LAYER	PARALLEL LAP	PITCH 1:6



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

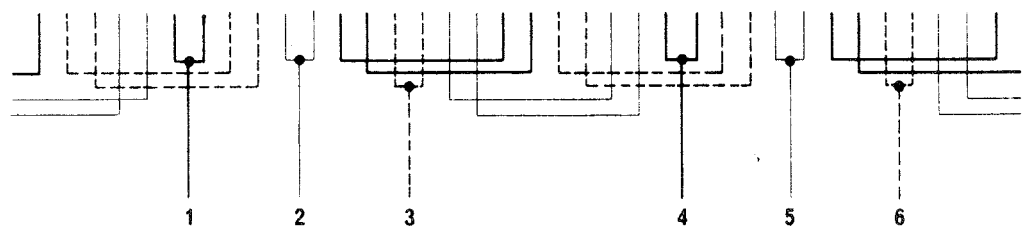


9 Cabos  
9 Kabel  
9 Leads

C



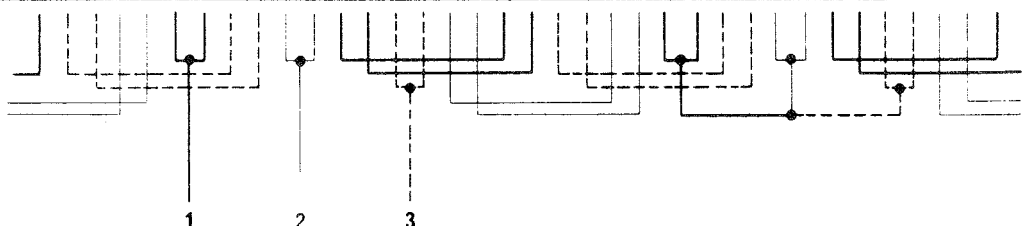
6 Cabos  
6 Kabel  
6 Leads



D



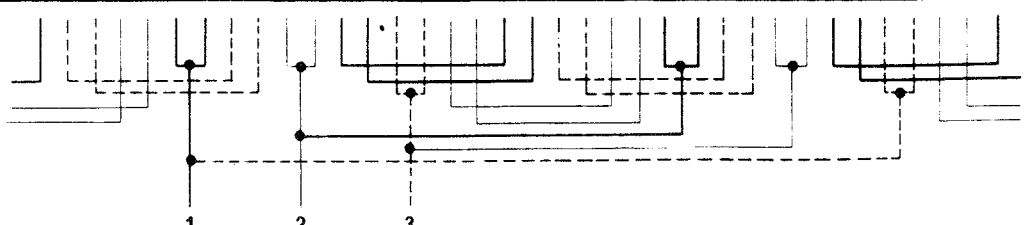
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

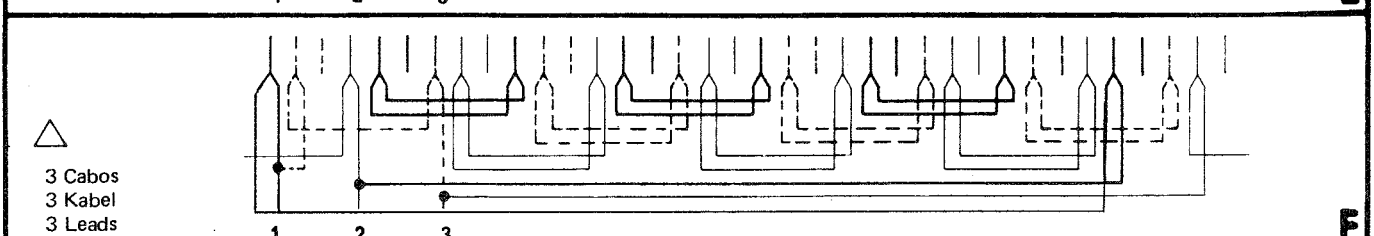
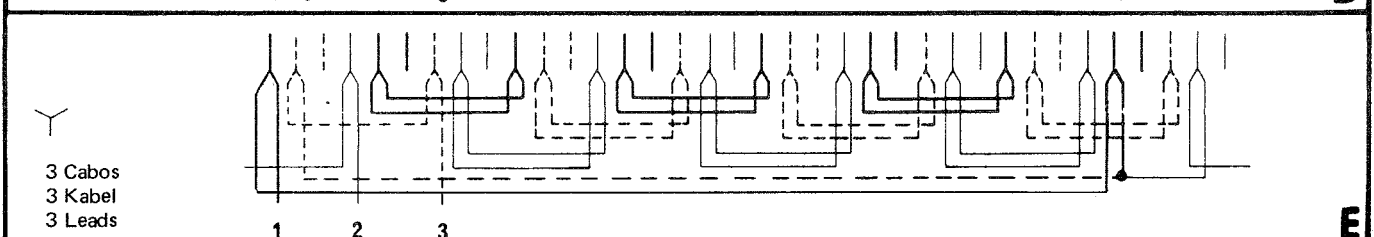
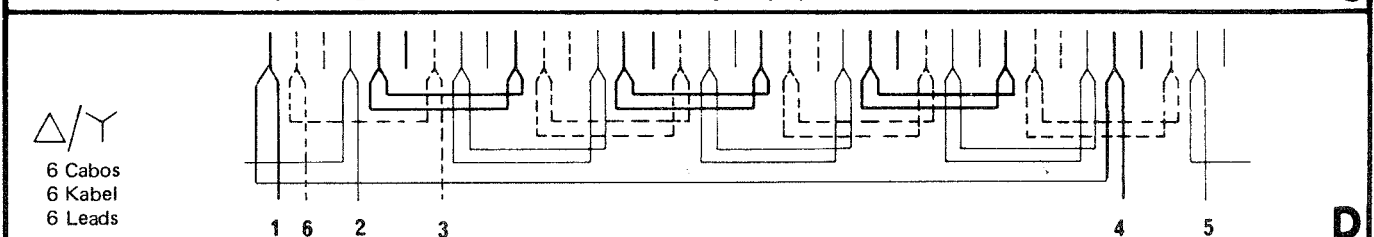
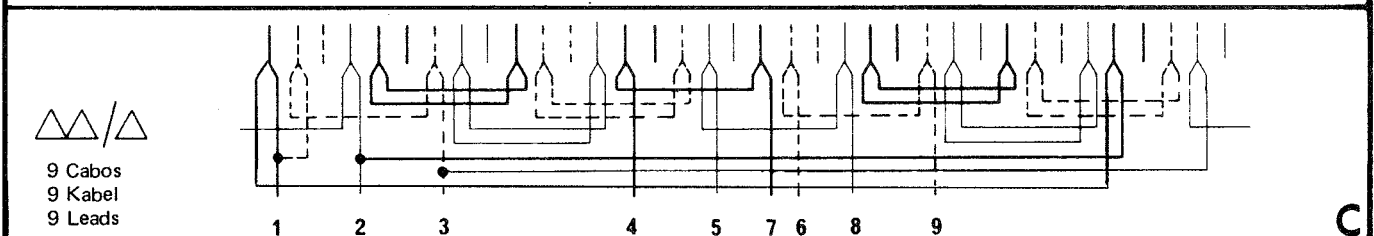
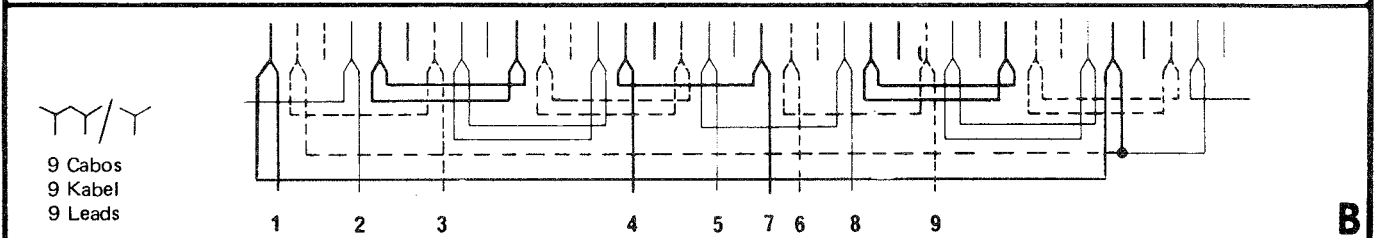
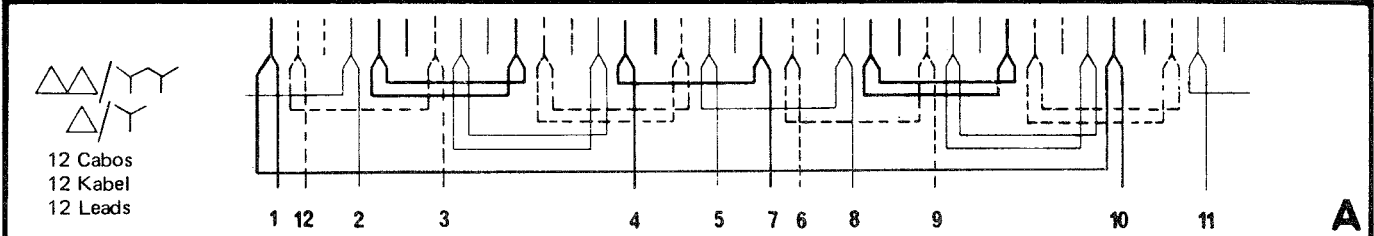
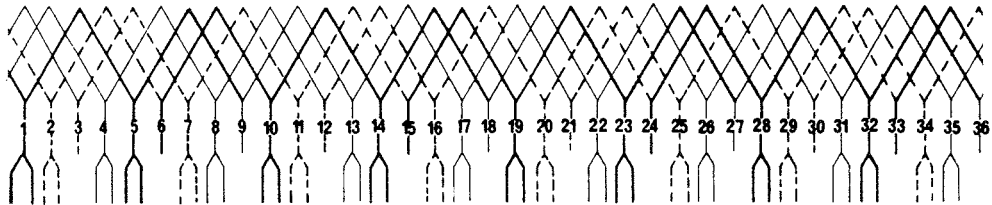
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 08 - 05/1  
(36-008-05/122-N)\*

TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:5
DREHSTROM	36 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:5
THREE-PHASE	36 SLOTS	8 POLES	TWO LAYER	SERIES LAP	PITCH 1:5



36 - 08 - 06/1  
(36-008-06/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

36 RANHURAS

8 POLOS

CAMADA  
DUPLA

IMBRICADO  
SÉRIE

PASSO 1:6

DREHSTROM

36 NUTEN

8 POLES

DOPPEL-  
SCHICHT

TRÄUFEL-  
WICKLUNG  
SERIE

WICKEL-  
SCHRITT 1:6

THREE-PHASE

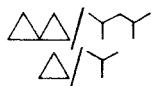
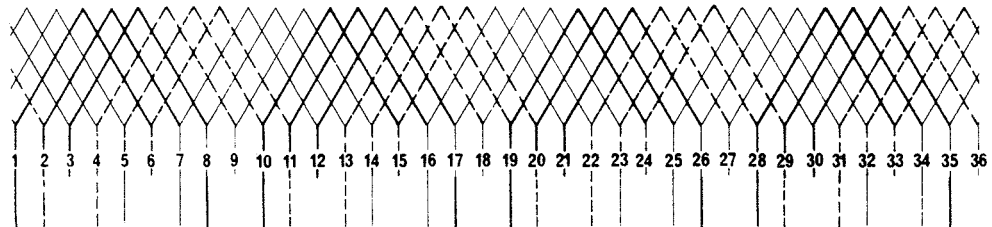
36 SLOTS

8 POLES

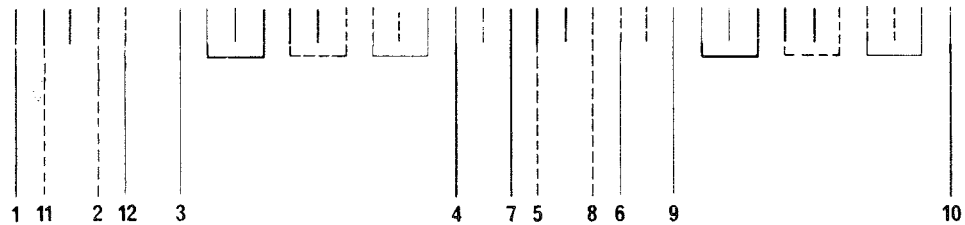
TWO LAYER

SERIES LAP

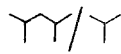
PITCH 1:6



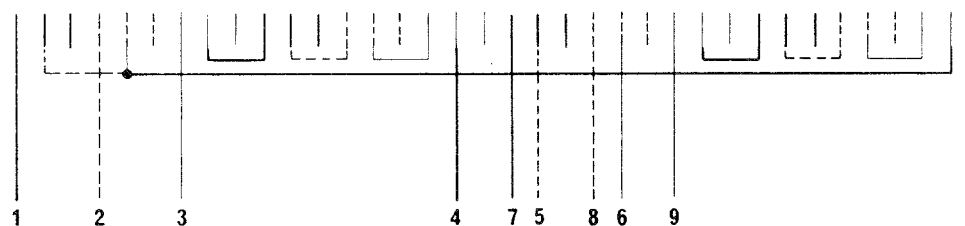
12 Cabos  
12 Kabel  
12 Leads



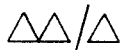
A



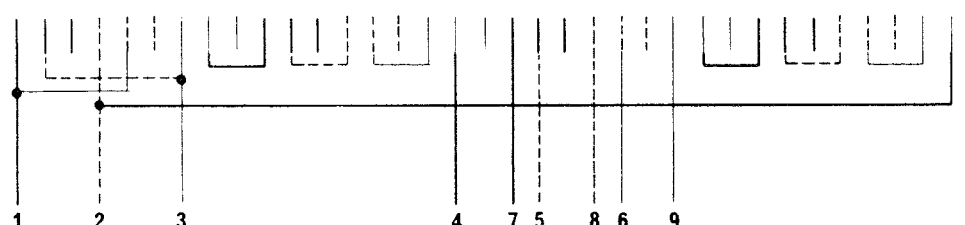
9 Cabos  
9 Kabel  
9 Leads



B



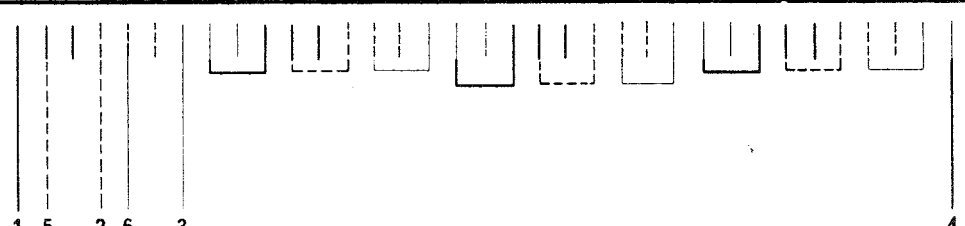
9 Cabos  
9 Kabel  
9 Leads



C



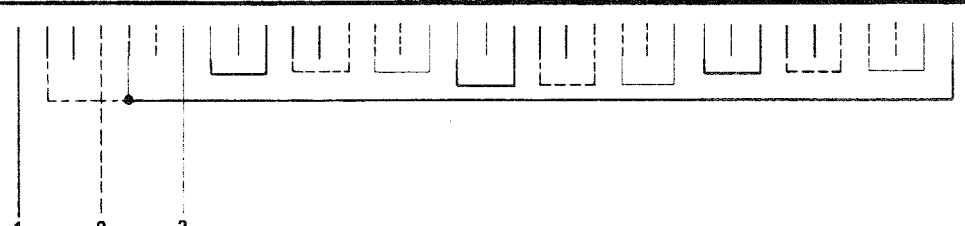
6 Cabos  
6 Kabel  
6 Leads



D



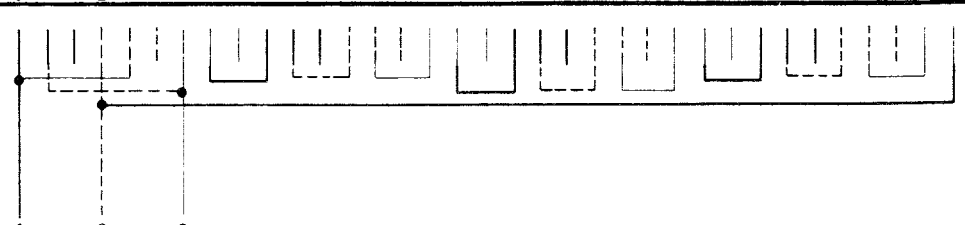
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

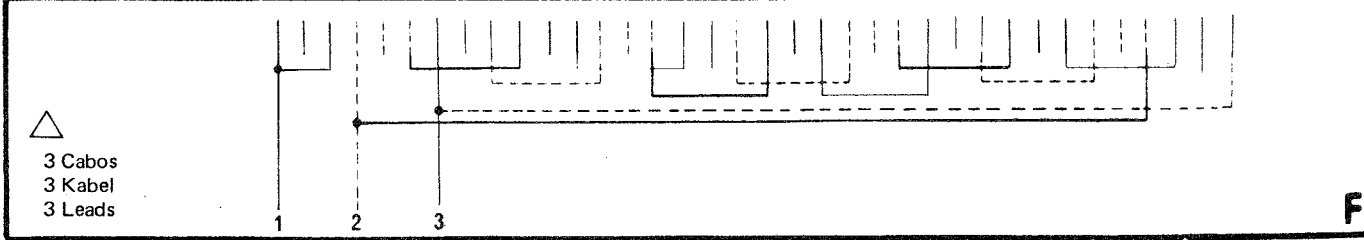
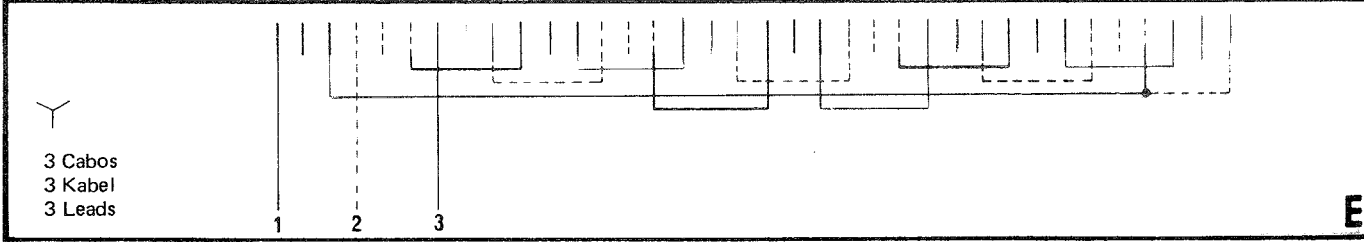
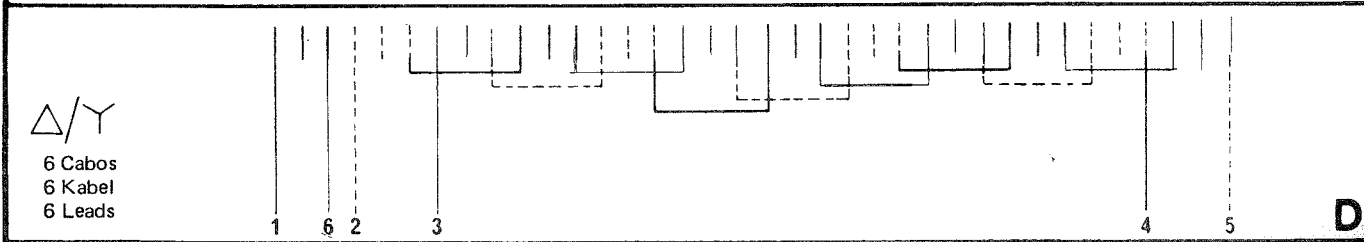
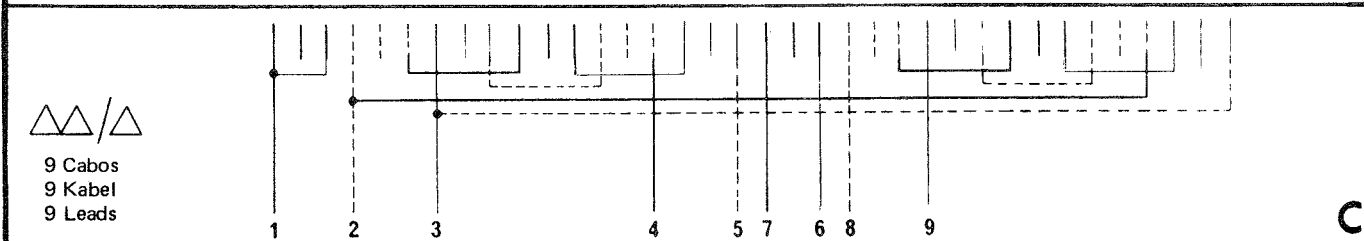
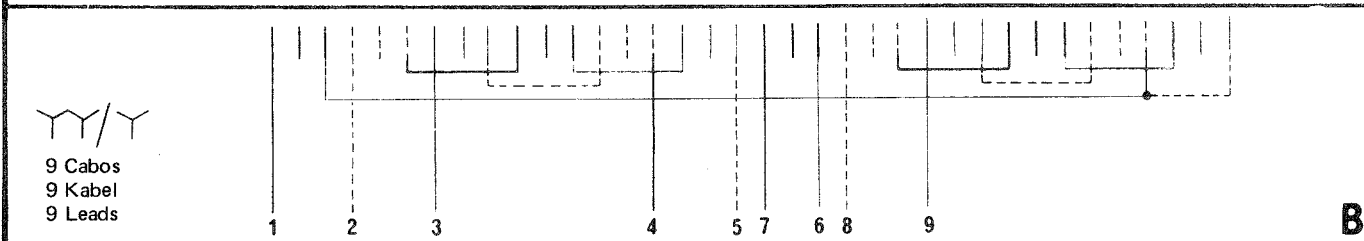
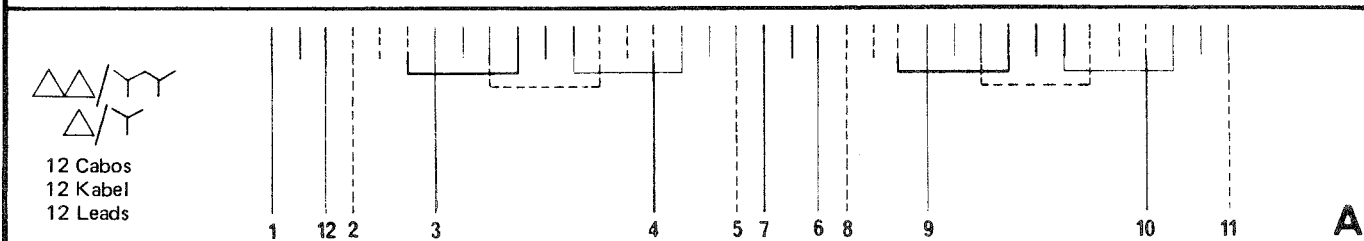
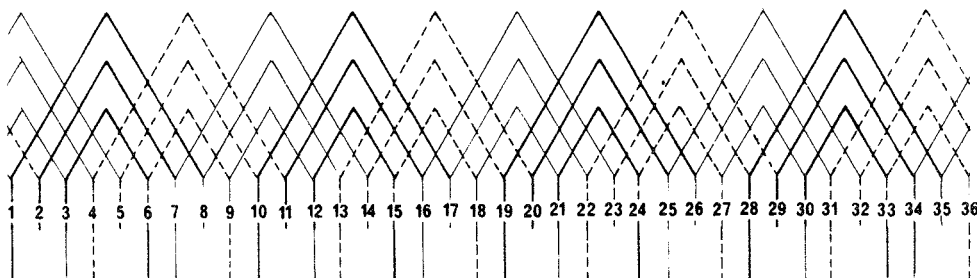
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 08 - 06/2  
(36-008-06/121-N)\*

TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:4:6:8
DREHSTROM	36 NUTEN	8 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:4:6:8
THREE-PHASE	36 SLOTS	8 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:4:6:8

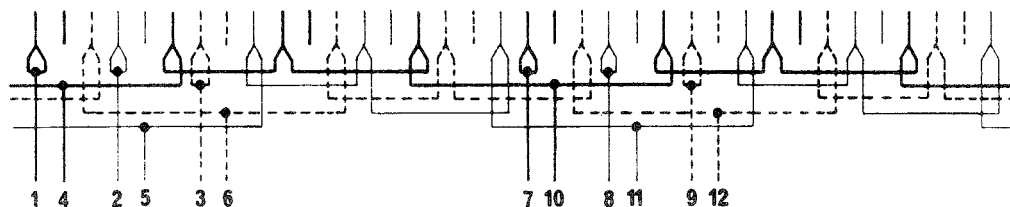
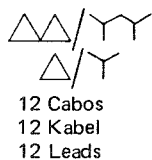
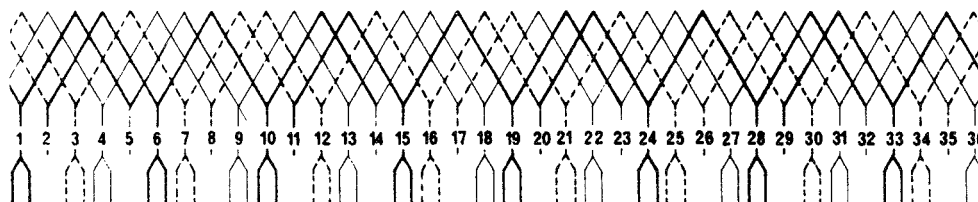


36 - 08 - 05/3  
(36-008-05/222-N)\*

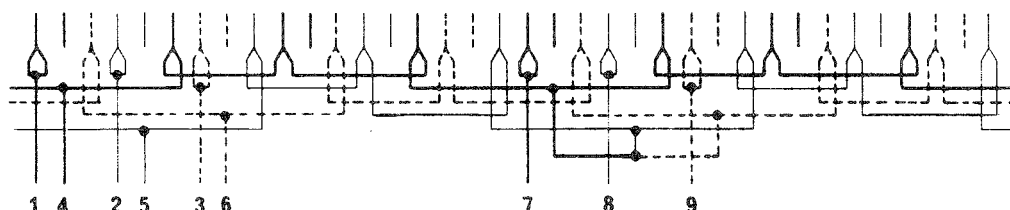
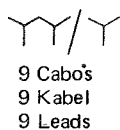
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



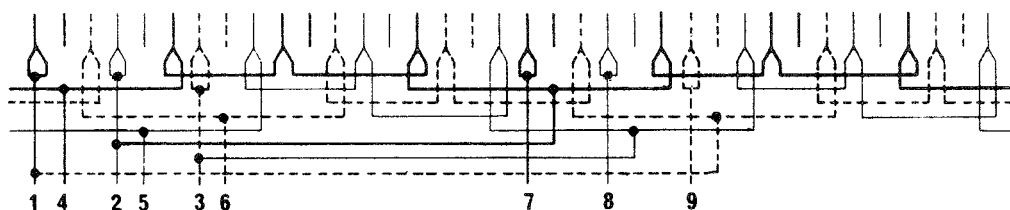
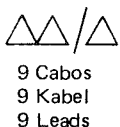
TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1.5
DREHSTROM	36 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1.5
THREE-PHASE	36 SLOTS	8 POLES	TWO LAYER	PARALLEL LAP	PITCH 1.5



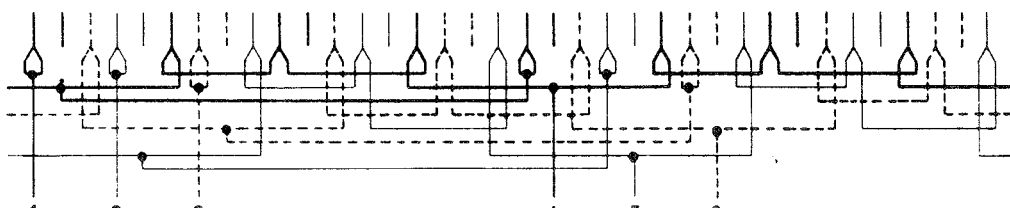
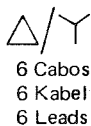
A



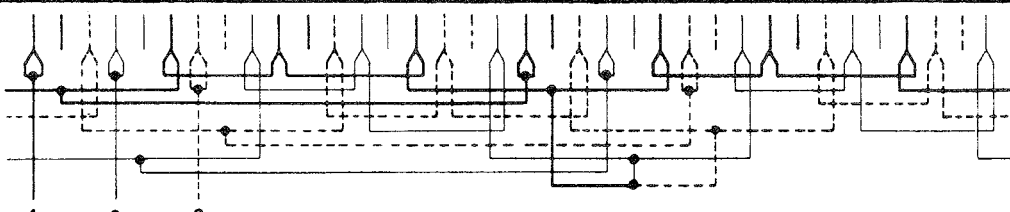
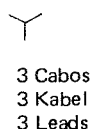
B



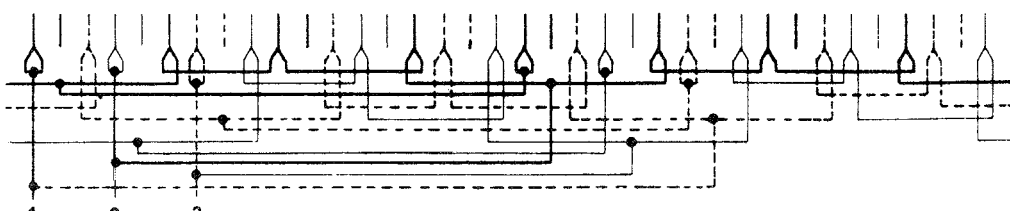
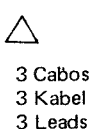
C



D



E



F

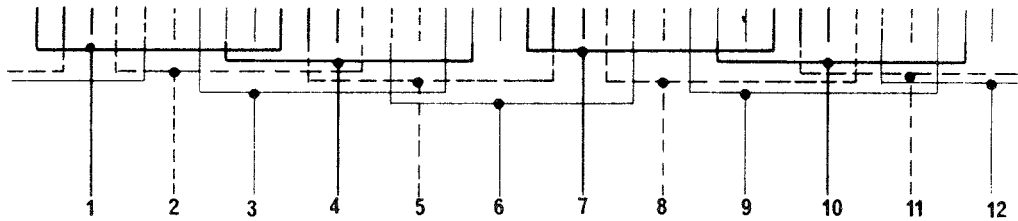
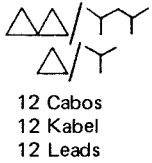
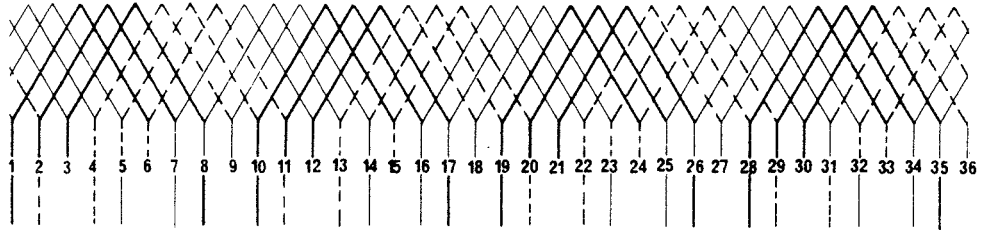
\*Nova nomenclatura



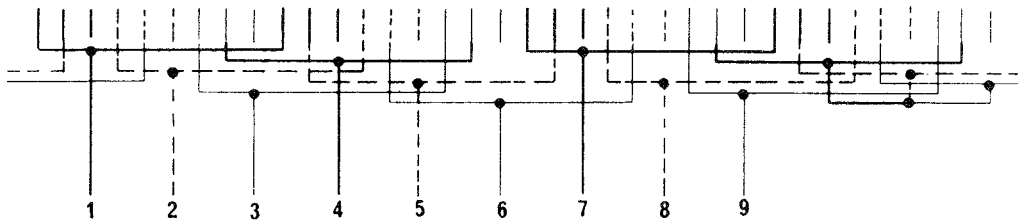
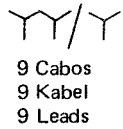
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 08 - 06/3  
(36-008-06/222-N)\*

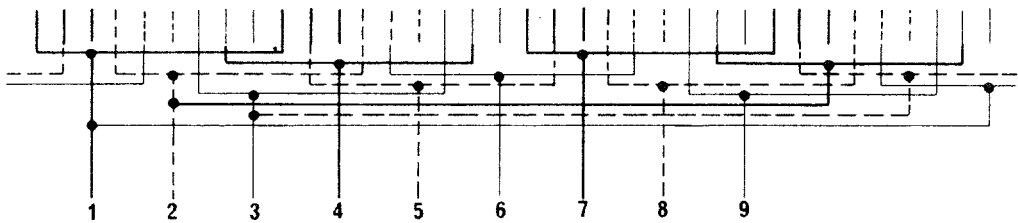
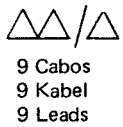
TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:6
DREHSTROM	36 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	8 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:6



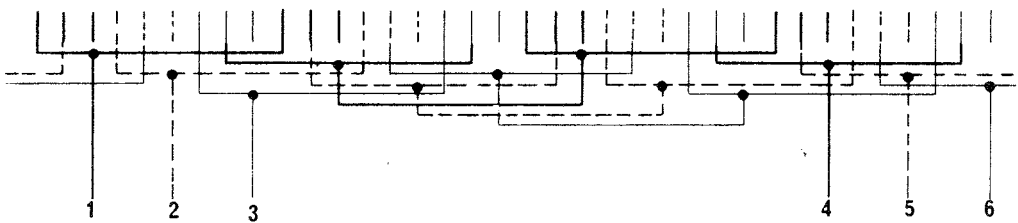
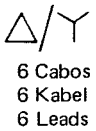
A



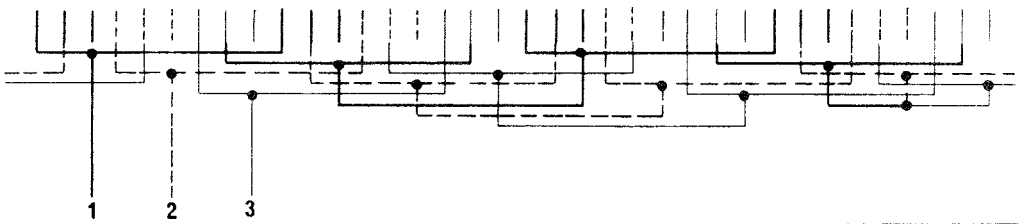
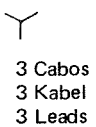
B



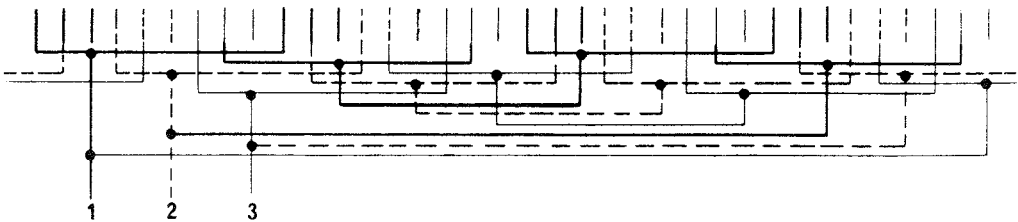
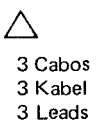
C



D



E



F

36 - 08 - 05/4  
(36-008-05/221-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

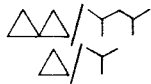
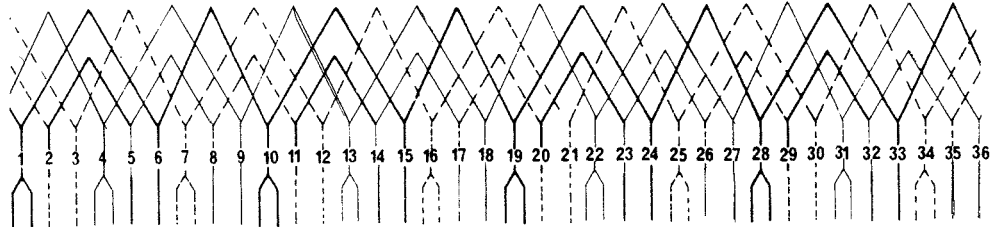
36 RANHURAS  
36 NUTEN  
36 SLOTS

8 POLOS  
8 POLE  
8 POLES

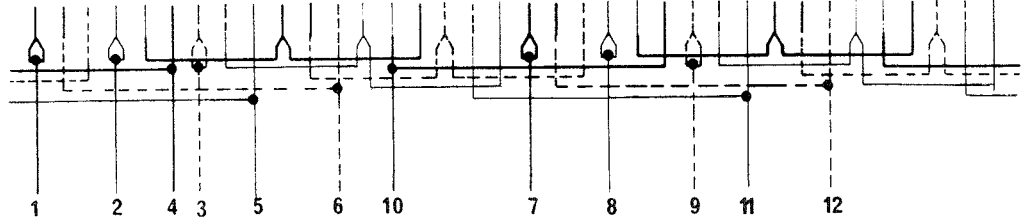
CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

CONCÊNTRICO PARALELO  
KONZENTRISCHE PARALLEL  
PARALLEL CONCENTRIC

PASSO 1:4:6  
1:5  
WICKEL-SCHRITT 1:5  
PITCH 1:4:6  
1:5



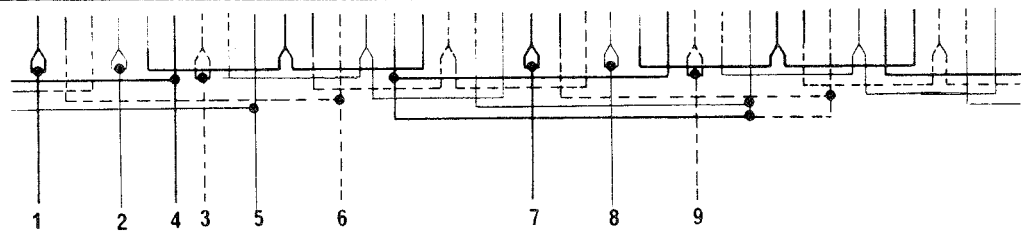
12 Cabos  
12 Kabel  
12 Leads



A



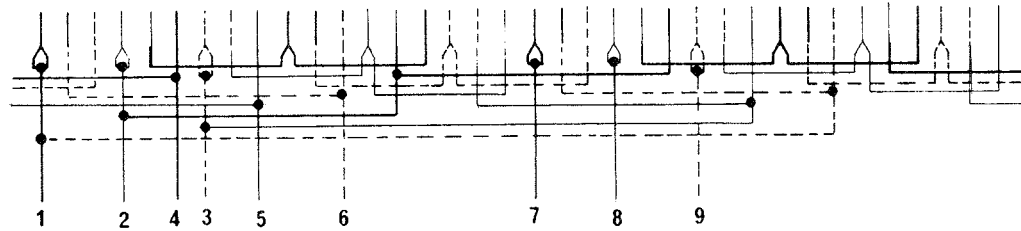
9 Cabos  
9 Kabel  
9 Leads



B



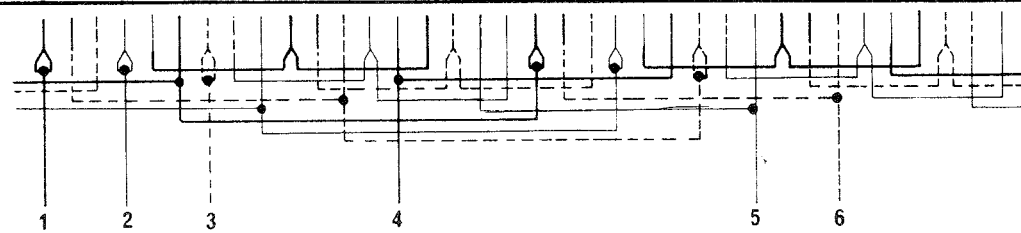
9 Cabos  
9 Kabel  
9 Leads



C



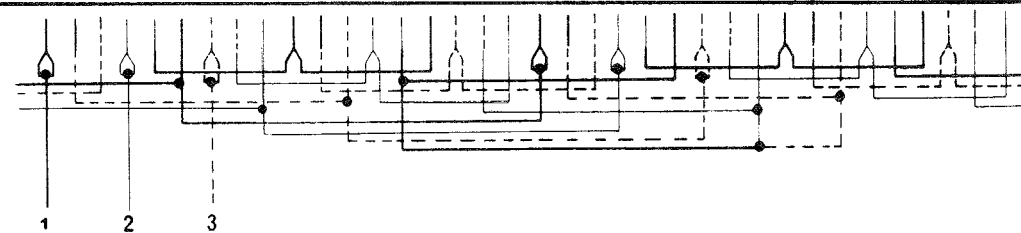
6 Cabos  
6 Kabel  
6 Leads



D



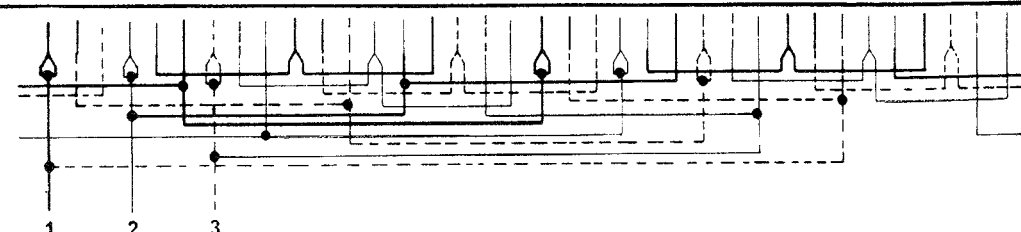
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

\*Nova nomenclatura

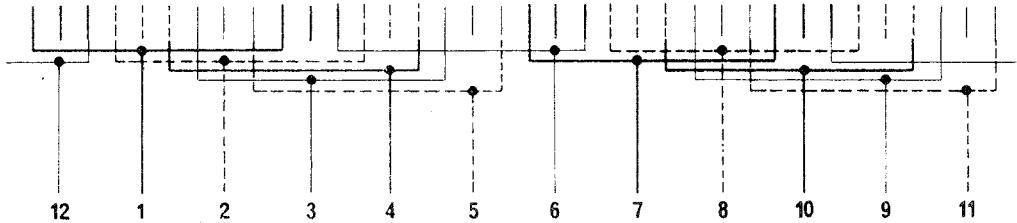
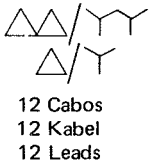
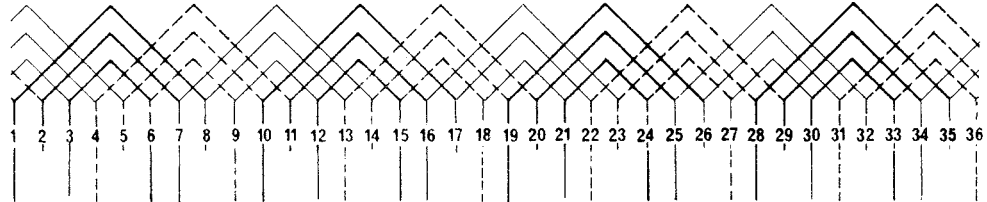




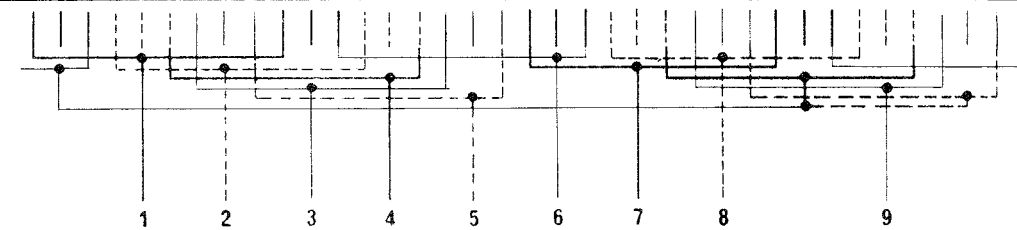
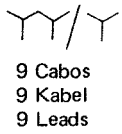
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 08 - 06/4  
(36-008-06/221-N)\*

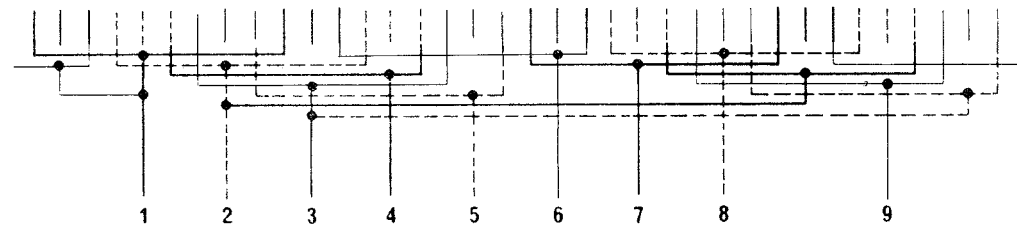
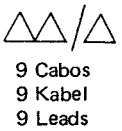
TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:4:6:8
DREHSTROM	36 NUTEN	8 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:4:6:8
THREE-PHASE	36 SLOTS	8 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:4:6:8



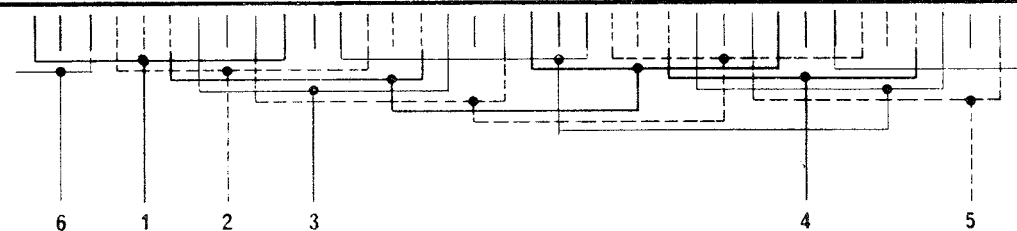
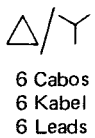
A



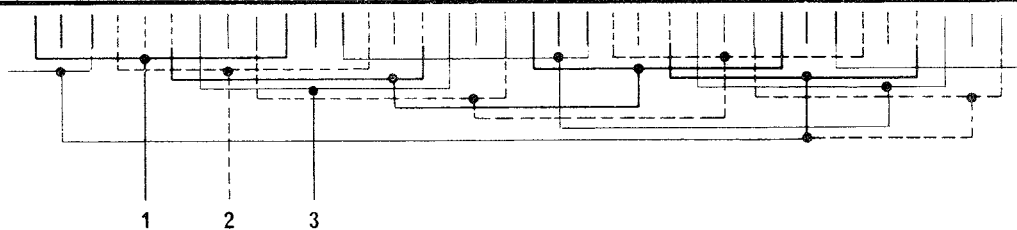
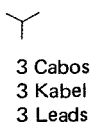
B



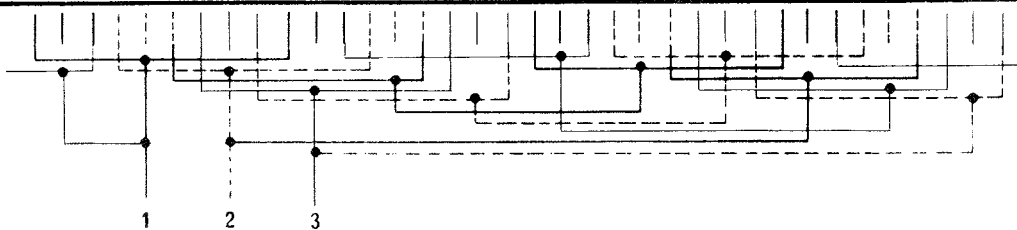
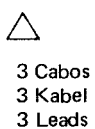
C



D



E



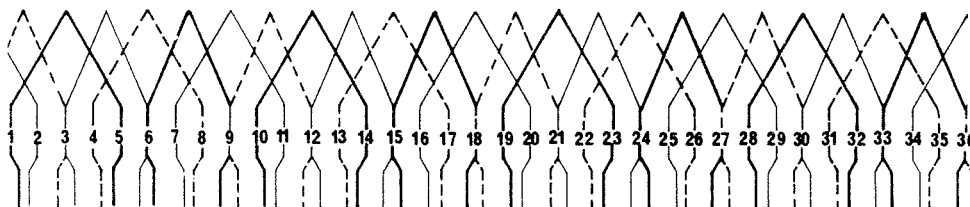
F

36 - 08 - 05/5  
(36-008-05/132-N)\*

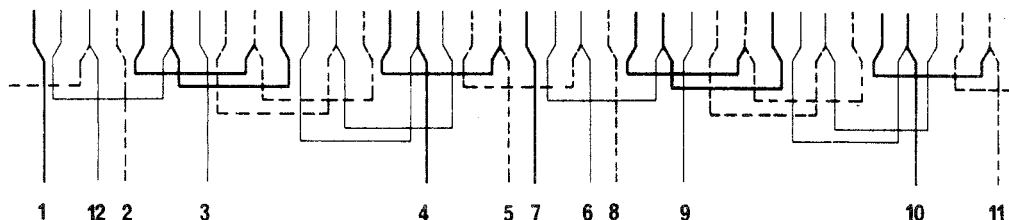
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	8 POLOS	MISTO	SÉRIE	PASSO 1:4 1:5
DREHSTROM	36 NUTEN	8 POLE	EINZEL- UND/ ODER DOPPEL- SCHICHT	SERIE	WICKEL- 1:4 SCHRITT 1:5
THREE-PHASE	36 SLOTS	8 POLES	SINGLE AND TWO LAYER	SERIES	PITCH 1:4 1:5



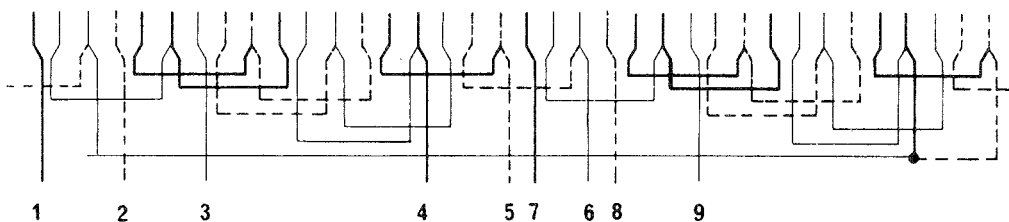
12 Cabos  
12 Kabel  
12 Leads



**A**



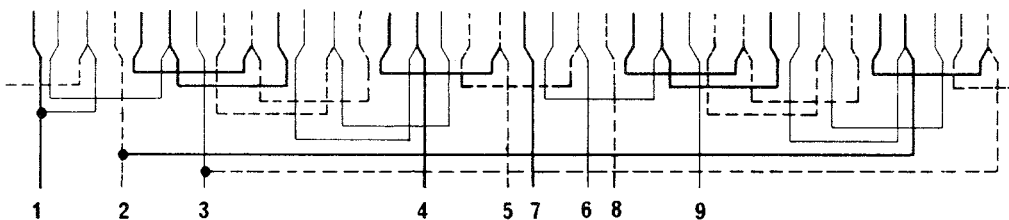
9 Cabos  
9 Kabel  
9 Leads



**B**



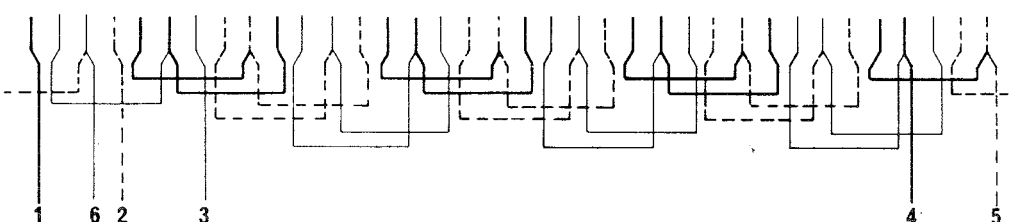
9 Cabos  
9 Kabel  
9 Leads



**C**



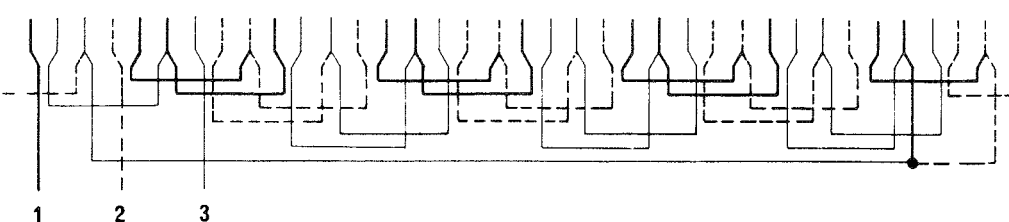
6 Cabos  
6 Kabel  
6 Leads



**D**



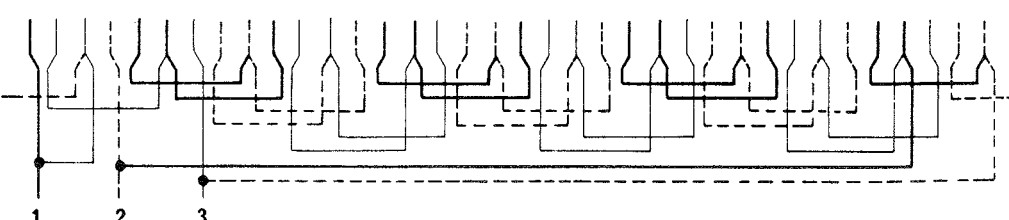
3 Cabos  
3 Kabel  
3 Leads



**E**



3 Cabos  
3 Kabel  
3 Leads



**F**

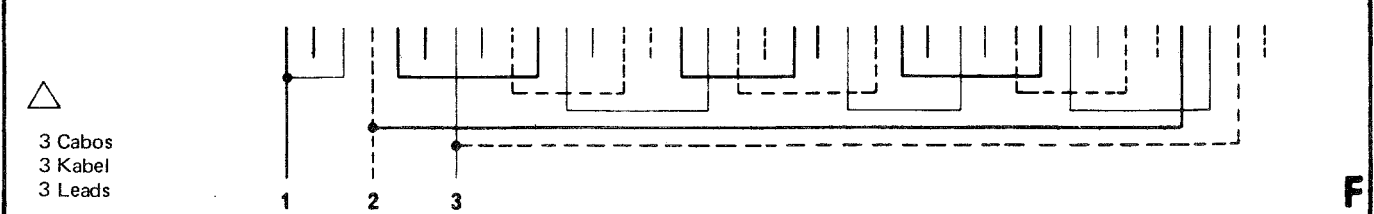
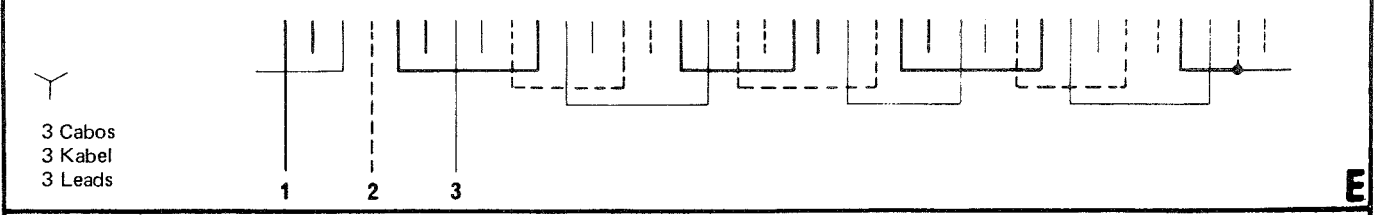
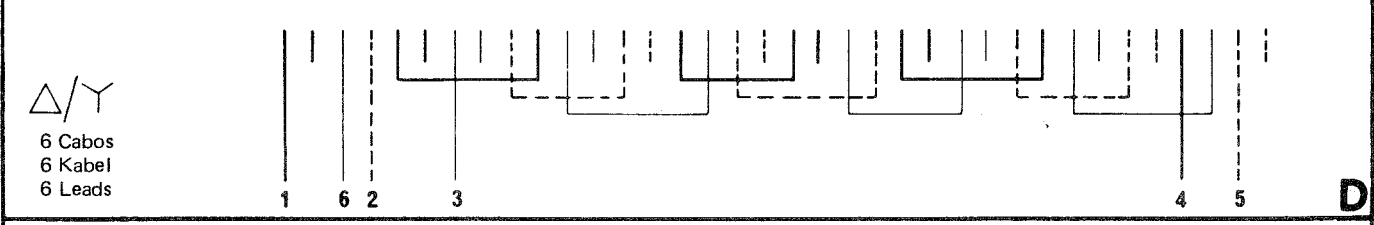
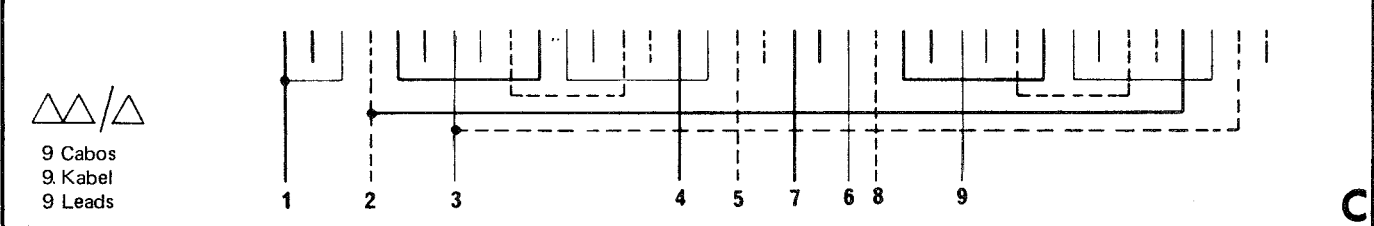
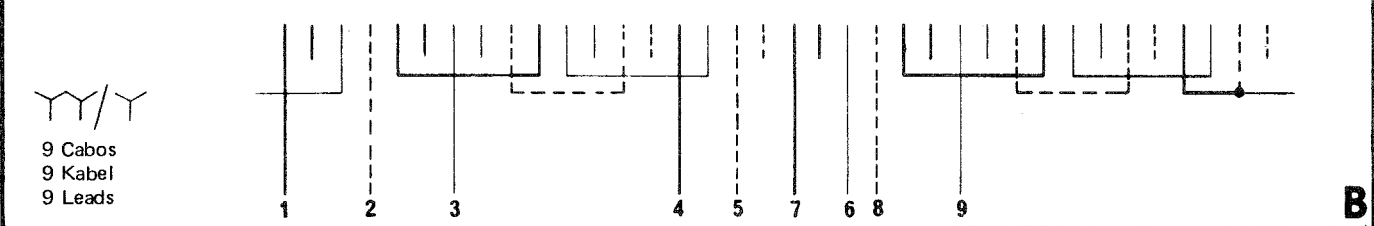
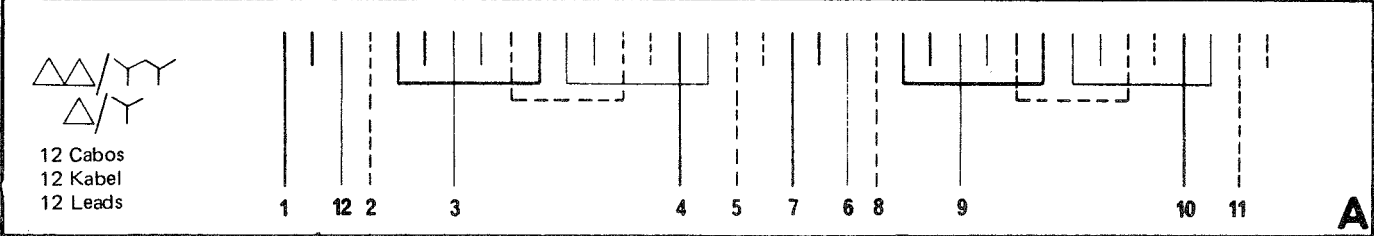
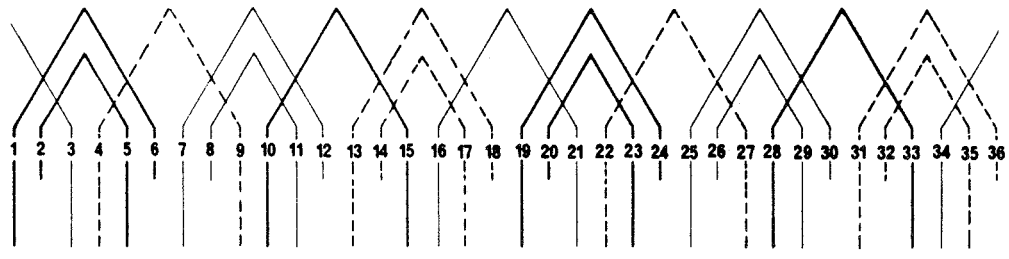
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 08 - 05/6  
(36-008-05/111-N)\*

TRIFÁSICO	36 RANHURAS	8 POLOS	CAMADA ÚNICA	CONCÊNTRICO SÉRIE	PASSO 1:6 1:4:6
DREHSTROM	36 NUTEN	8 POLE	EINZEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:6 1:4:6
THREE-PHASE	36 SLOTS	8 POLES	SINGLE LAYER	SERIES CONCENTRIC	PITCH 1:6 1:4:6

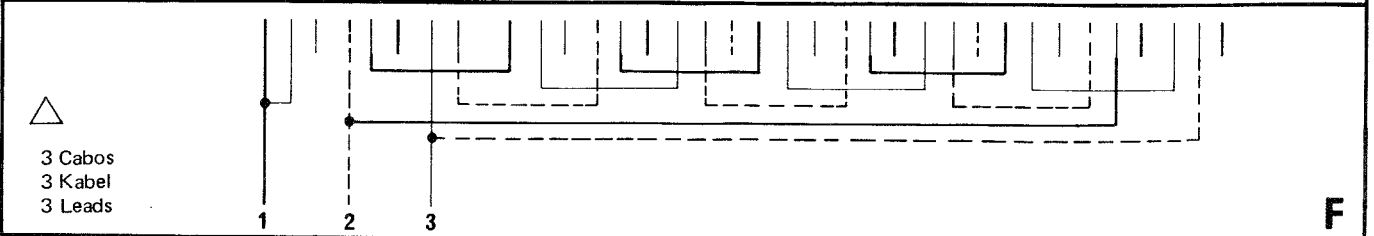
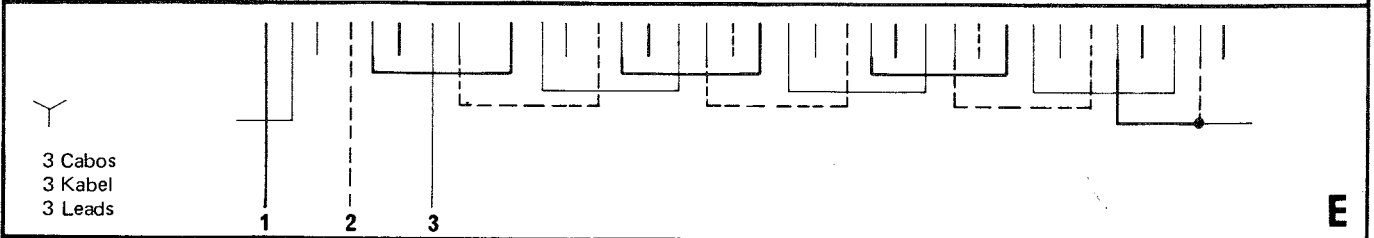
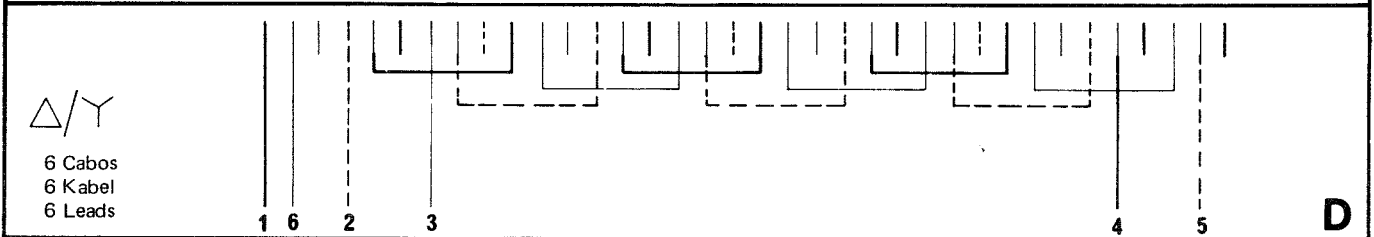
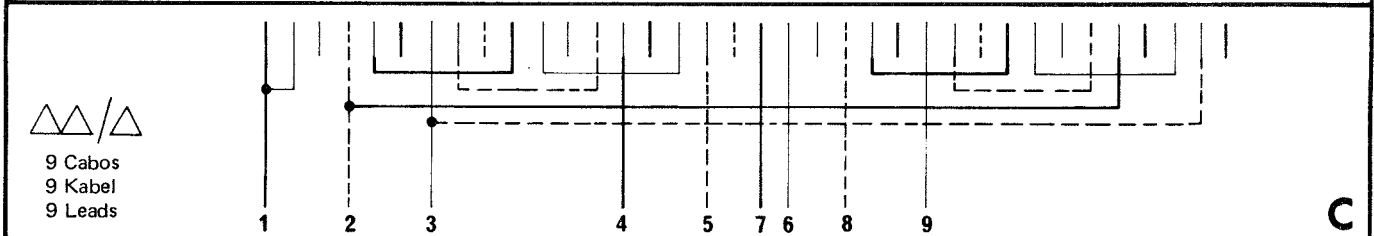
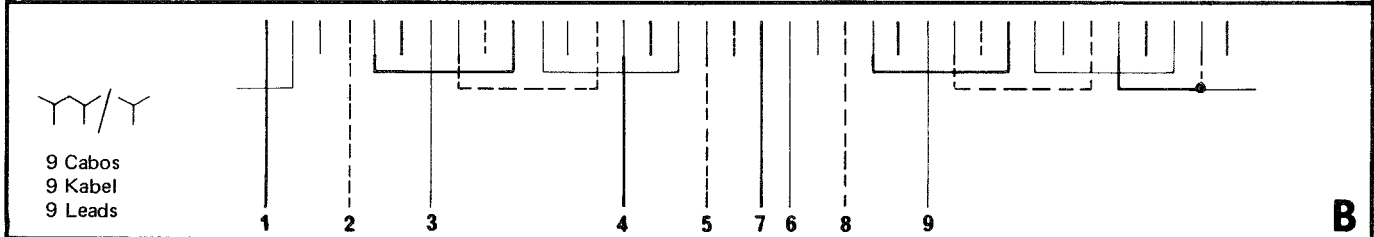
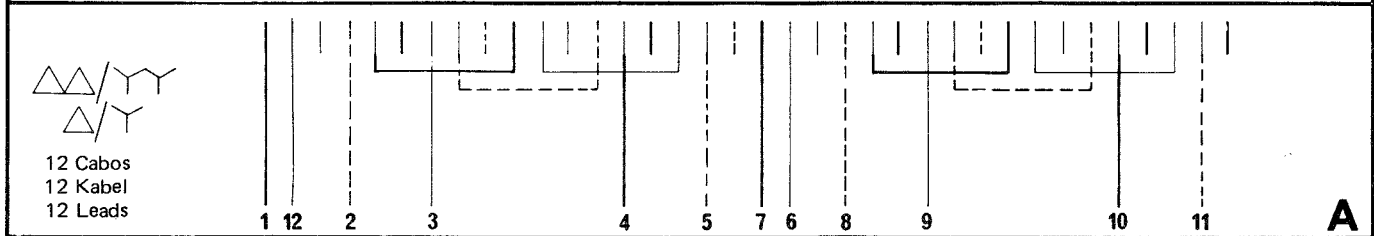
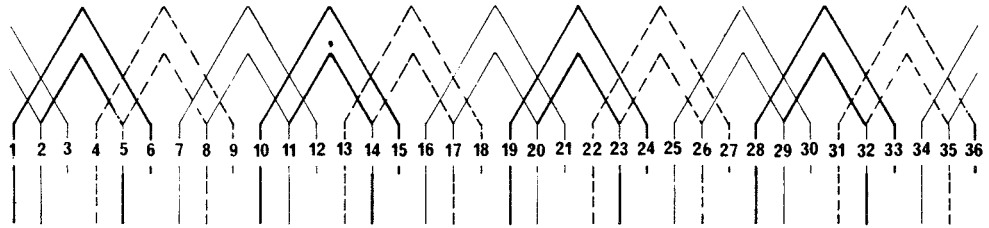


36 - 08 - 05/7  
(36-008-05/131-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	8 POLOS	MISTO	CONCÊNTRICO SÉRIE	PASSO 1:4:6
DREHSTROM	36 NUTEN	8 POLE	EINZEL- UND/ ODER DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:4:6
THREE-PHASE	36 SLOTS	8 POLES	SINGLE AND TWO LAYER	SERIES CONCENTRIC	PITCH 1:4:6



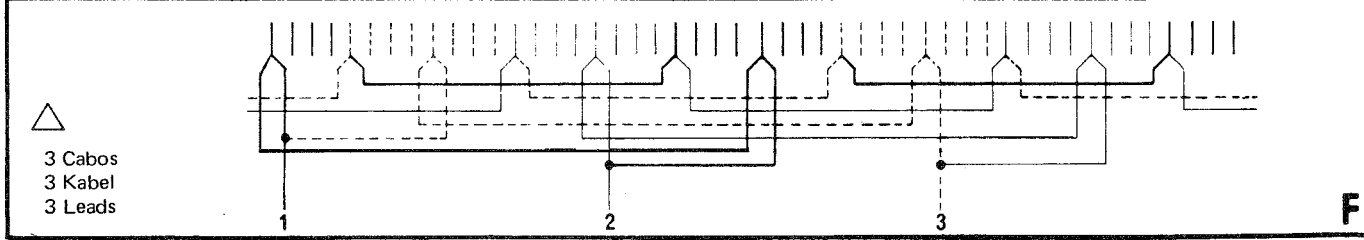
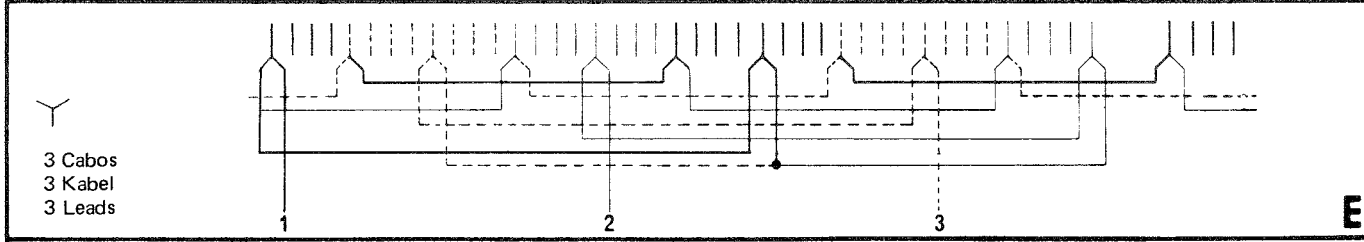
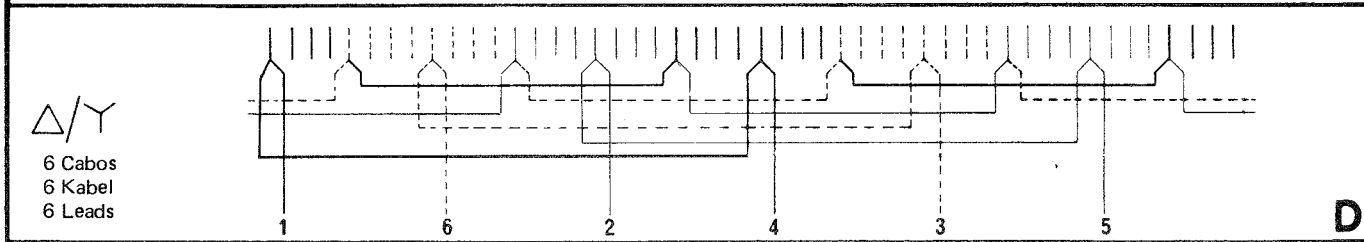
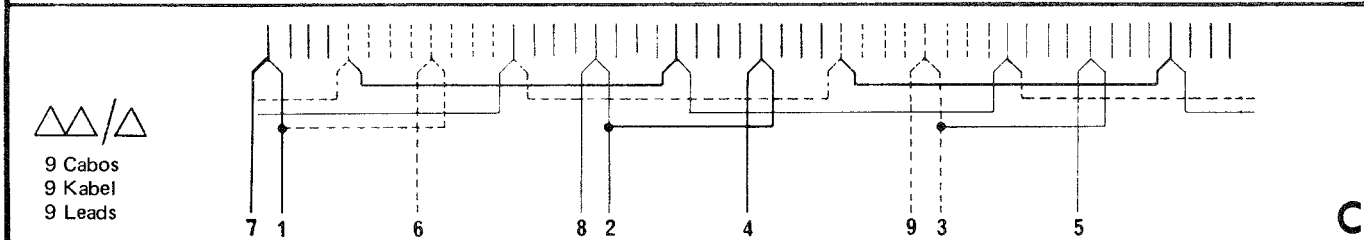
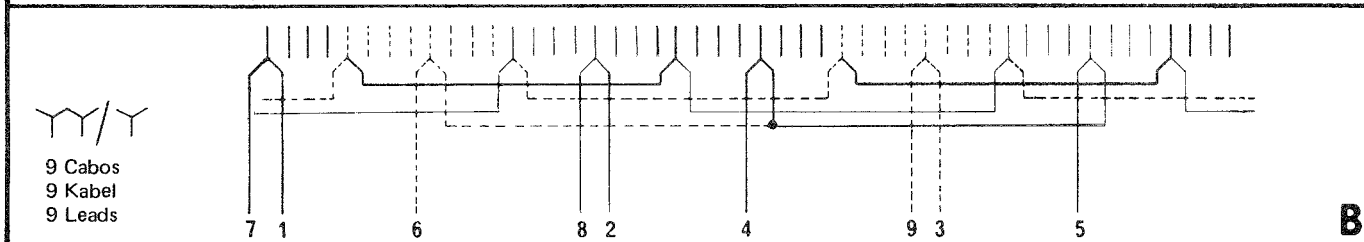
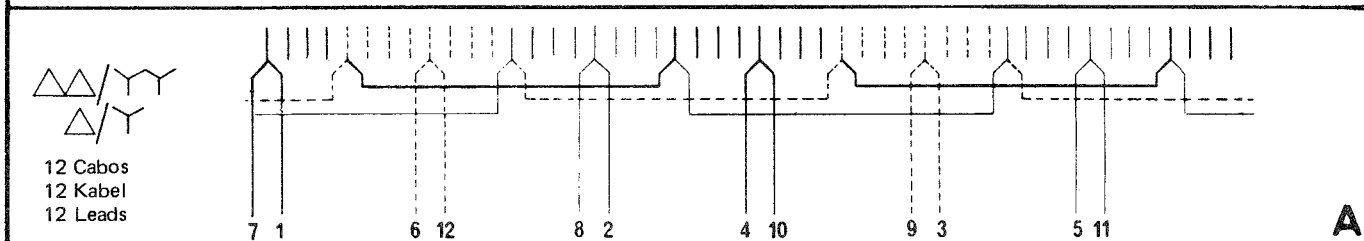
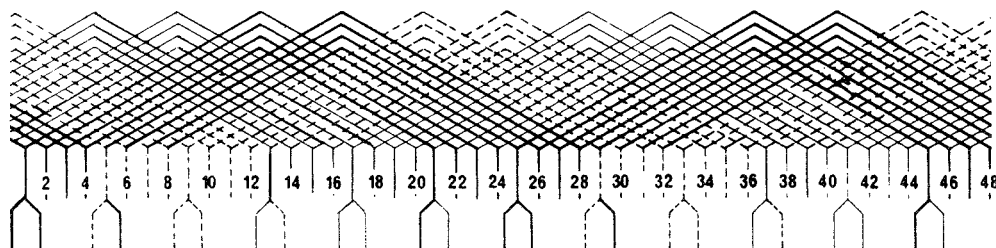
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 02 - 21/1  
(48-002-21/121-N)\*

TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:18:20 :22:24
DREHSTROM	48 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL- 1:18:20 SCHRITT :22:24
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	SÉRIES CONCENTRIC	PITCH 1:18:20 :22:24

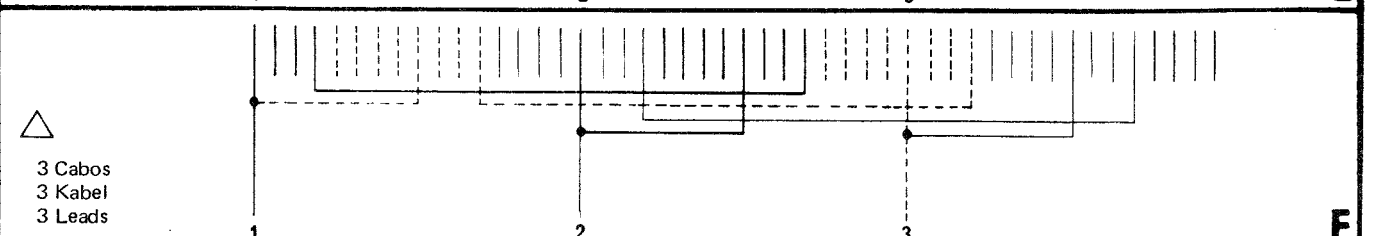
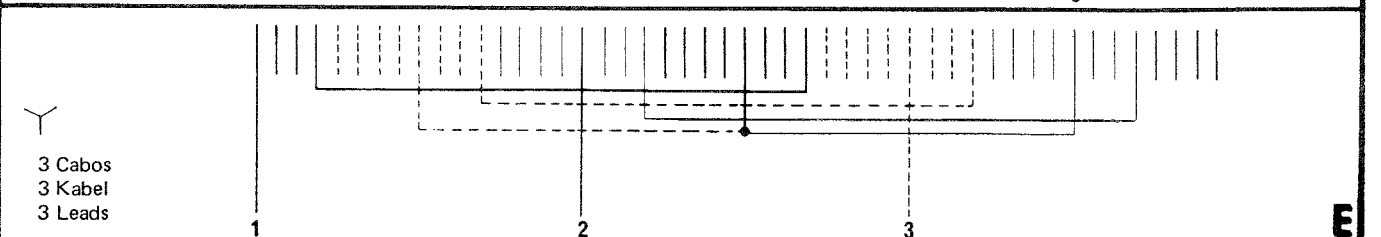
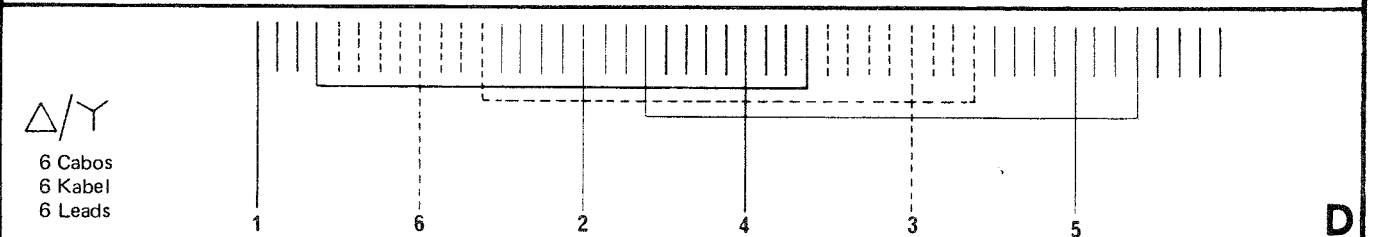
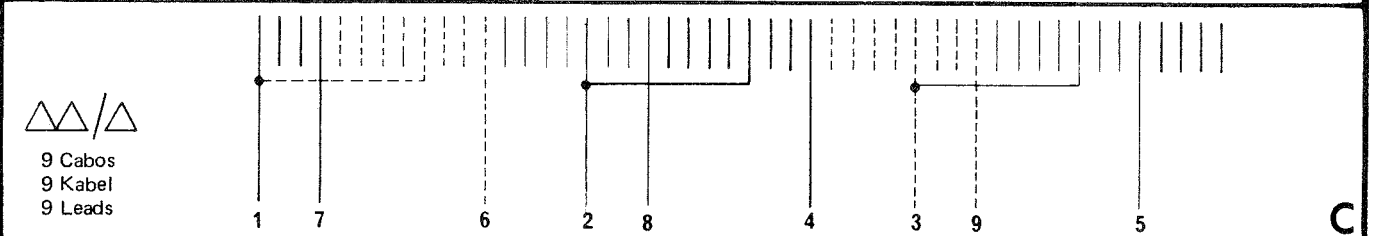
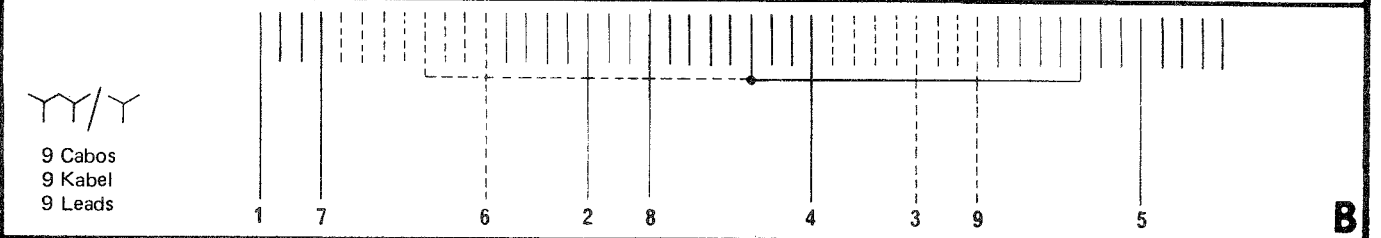
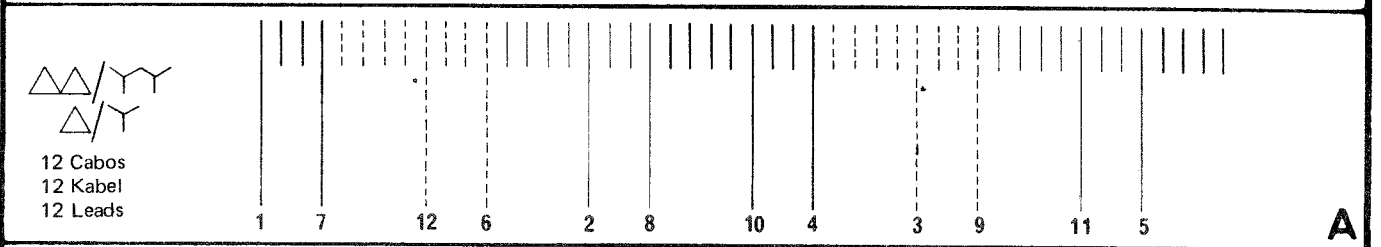
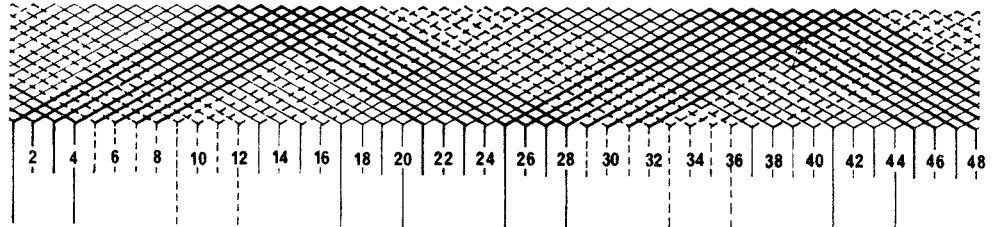


48 - 02 - 21/2  
(48-002-21/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:21
DREHSTROM	48 NUTEN	2 POLE	DOPPEL SCHICHT	TRAUFLWICKLUNG SÉRIE	WICKEL-SCHRITT 1:21
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	SERIES LAP	PITCH 1:21



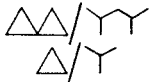
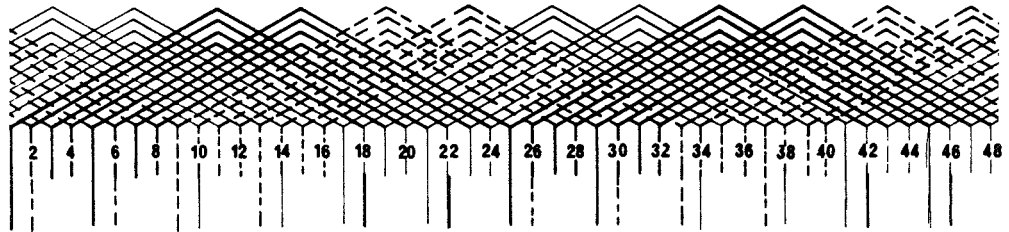
\*Nova nomenclatura



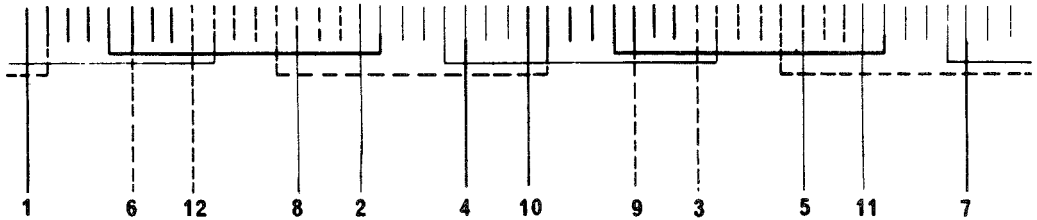
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 02 - 18/4  
(48-002-18/121-N)\*

TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:15:17 :19:21
DREHSTROM	48 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT :1:15:17 :19:21
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:15:17 :19:21



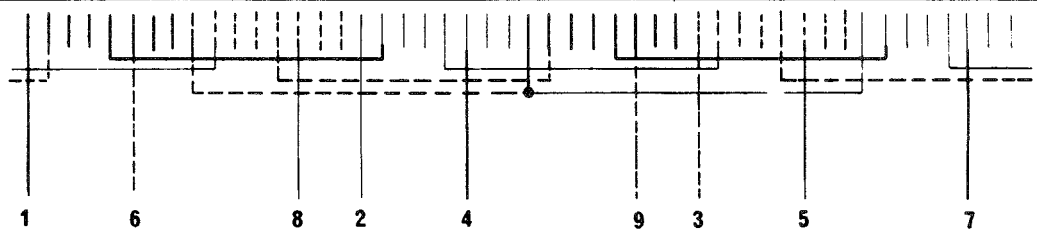
12 Cabos  
12 Kabel  
12 Leads



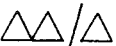
**A**



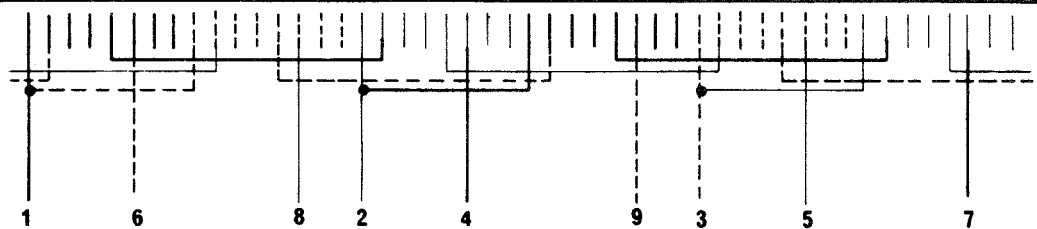
9 Cabos  
9 Kabel  
9 Leads



**B**



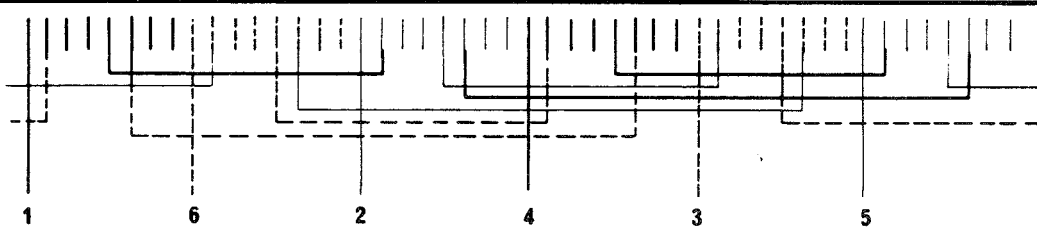
9 Cabos  
9 Kabel  
9 Leads



**C**



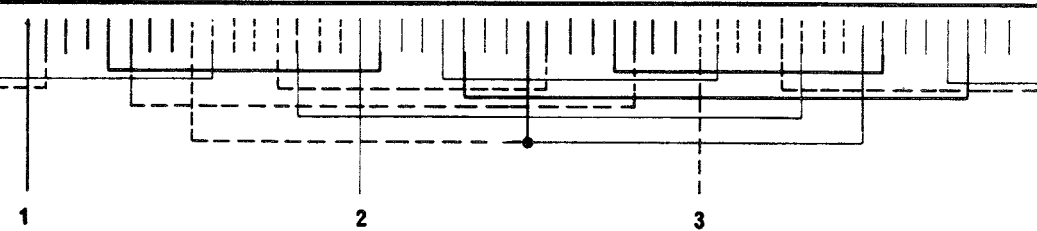
6 Cabos  
6 Kabel  
6 Leads



**D**



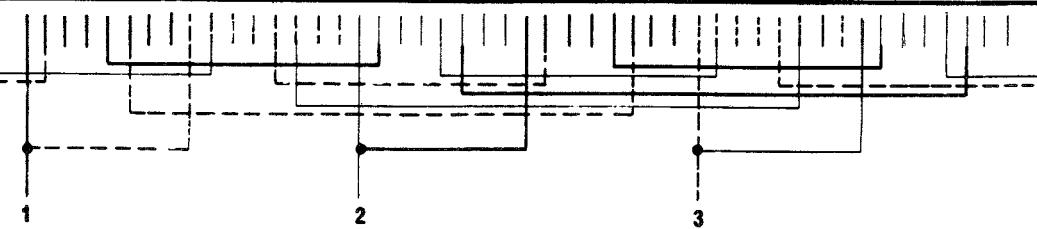
3 Cabos  
3 Kabel  
3 Leads



**E**



3 Cabos  
3 Kabel  
3 Leads



**F**

48 - 02 - 18/3  
(48-002-18/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFASICO

48 RANHURAS

2 POLOS

CAMADA DUPLA

IMBRICADO SÉRIE

PASSO 1:18

DREHSTROM

48 NUTEN

2 POLE

DOPPEL-SCHICHT

TRÄUFEL-WICKLUNG SÉRIE

WICKEL-SCHRITT 1:18

THREE-PHASE

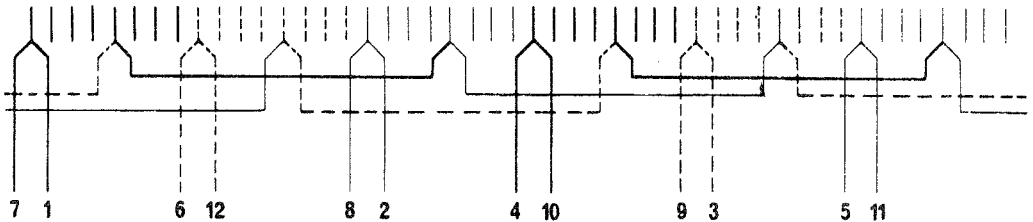
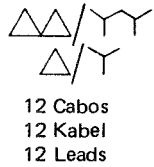
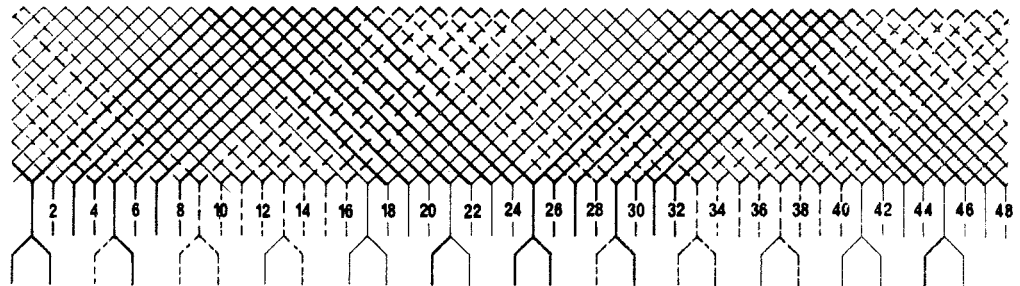
48 SLOTS

2 POLES

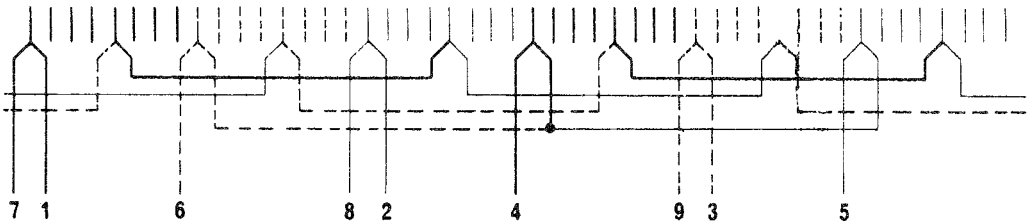
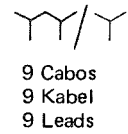
TWO LAYER

SERIES LAP

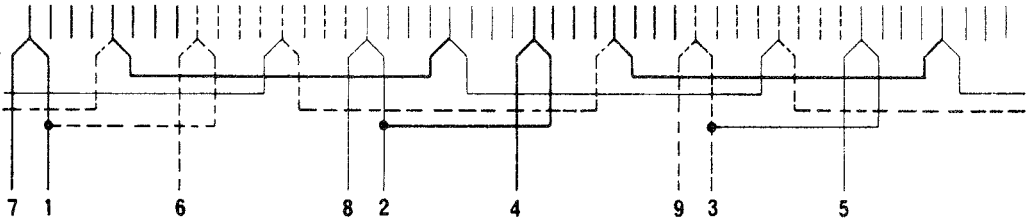
PITCH 1:18



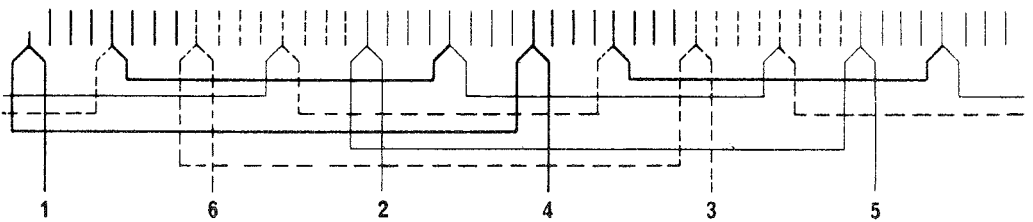
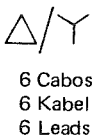
A



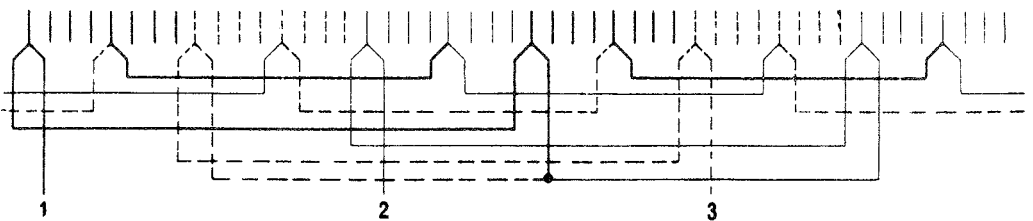
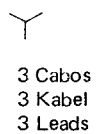
B



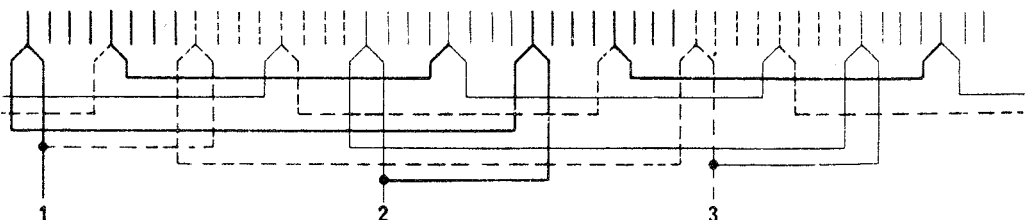
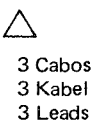
C



D



E



F

\*Nova nomenclatura

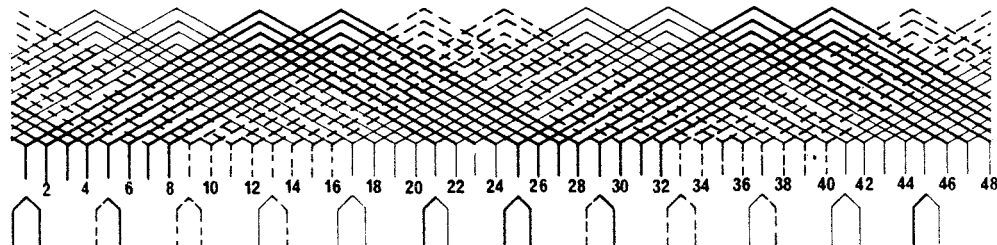




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 02 - 21/3  
(48-002-21/221-N)\*

TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:18:20 :22:24
DREHSTROM	48 NUTEN	2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT :1:18:20 :22:24
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:18:20 :22:24



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

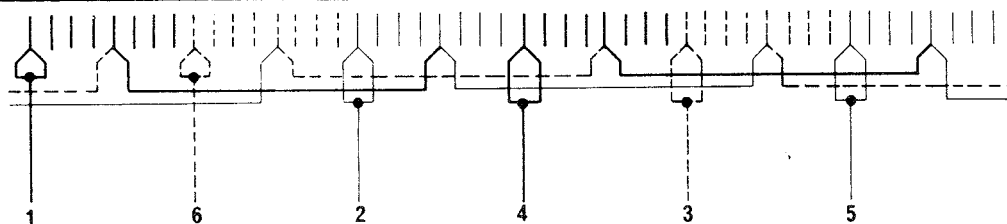


9 Cabos  
9 Kabel  
9 Leads

C



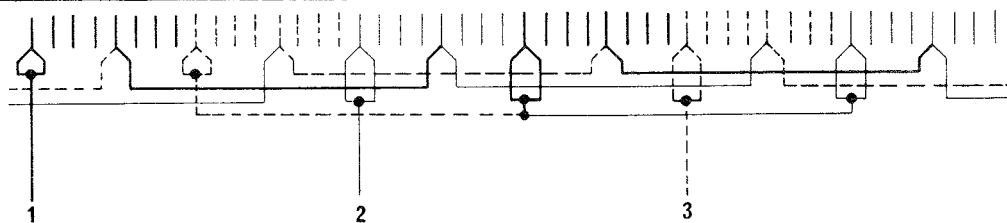
6 Cabos  
6 Kabel  
6 Leads



D



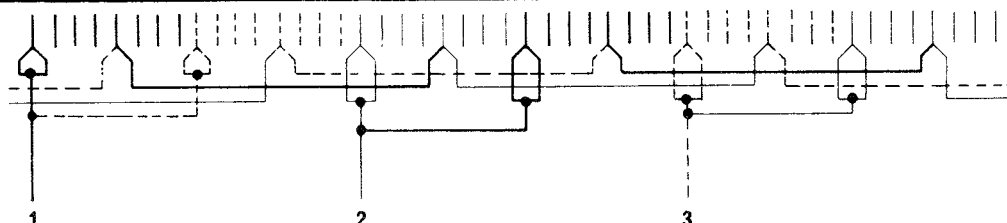
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



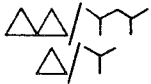
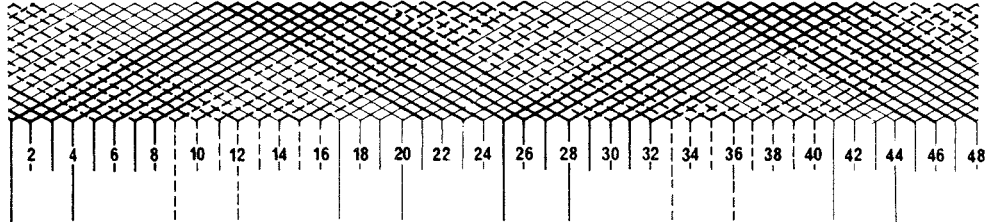
F

48 - 02 - 21/4  
(48-002-21/222-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

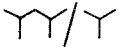


TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:21
DREHSTROM	48 NUTEN	2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:21
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:21



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

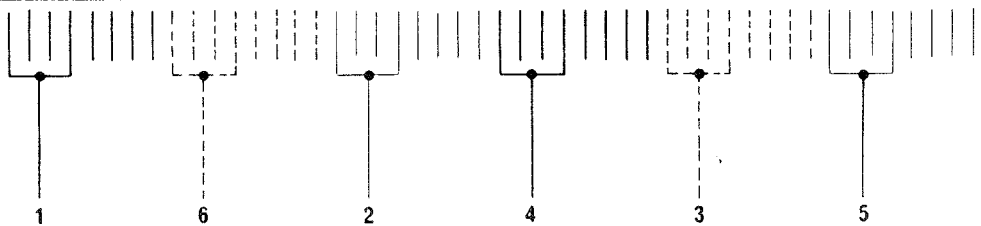


9 Cabos  
9 Kabel  
9 Leads

C



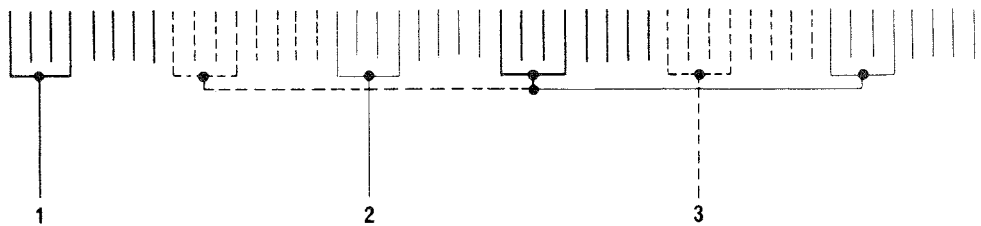
6 Cabos  
6 Kabel  
6 Leads



D



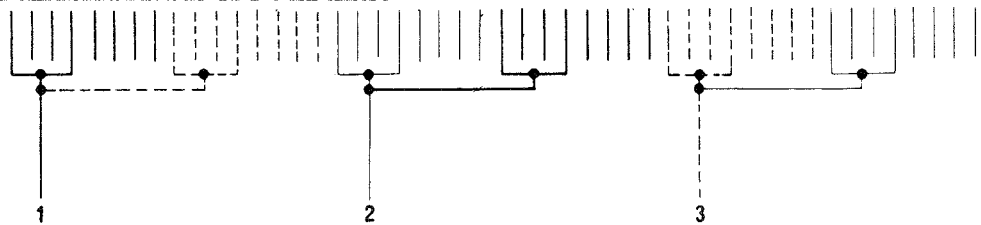
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

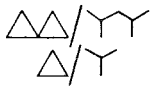
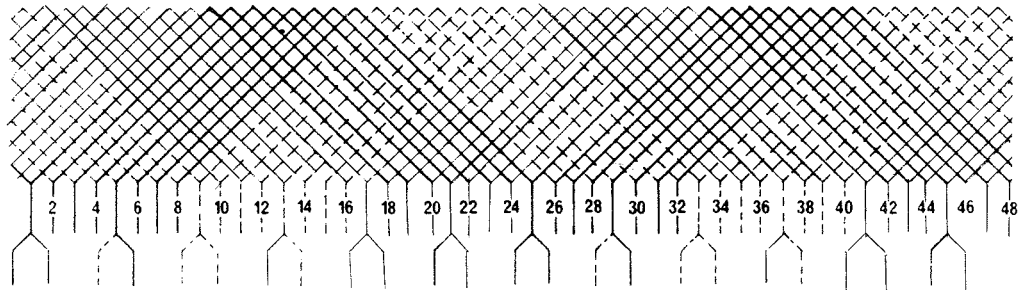
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

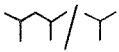
48 - 02 - 18/1  
(48-002-18/222-N)\*

TRIFÁSICO	48 RANHURAS	2 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:18
DREHSTROM	48 NUTEN	2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:18
THREE-PHASE	48 SLOTS	2 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:18



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

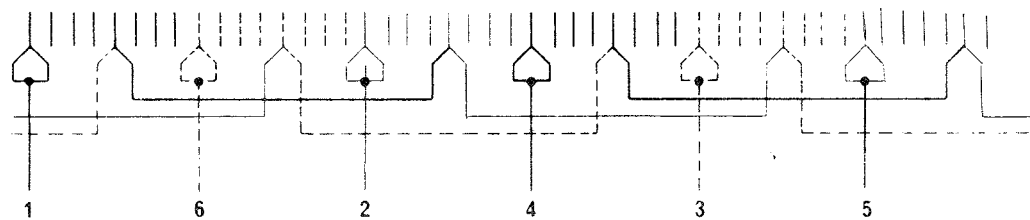


9 Cabos  
9 Kabel  
9 Leads

C



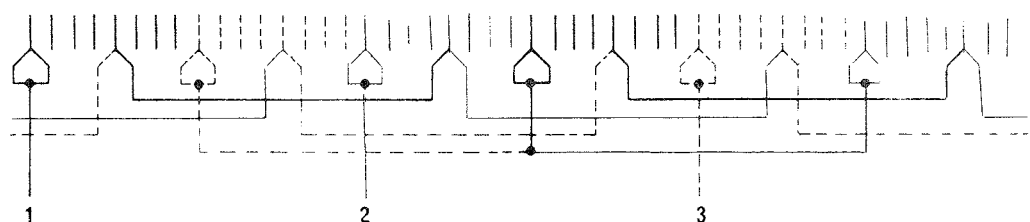
6 Cabos  
6 Kabel  
6 Leads



D



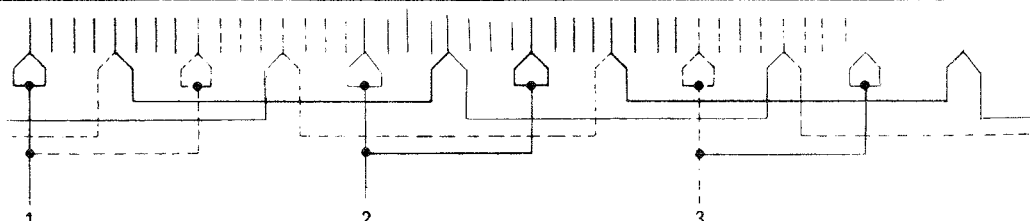
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

48 - 02 - 18/2  
(48-002-18/221-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

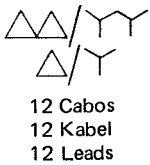
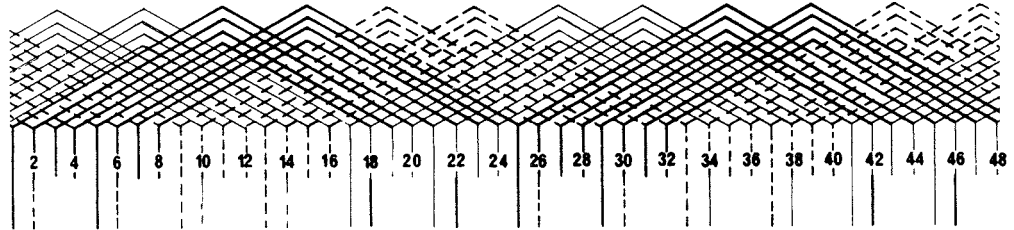
48 RANHURAS  
48 NUTEN  
48 SLOTS

2 POLOS  
2 POLE  
2 POLES

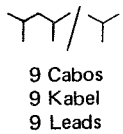
CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

CONCÊNTRICO PARALELO  
KONZENTRISCHE PARALLEL  
PARALLEL CONCENTRIC

PASSO 1:15:17 :19:21  
WICKEL- 1:15:17 SCHRITT :19:21  
PITCH 1:15:17 :19:21



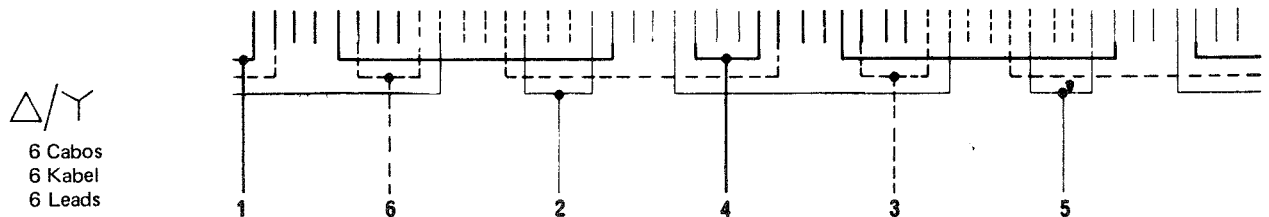
A



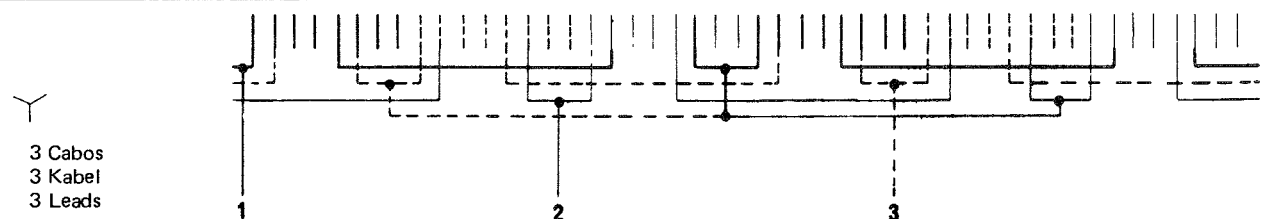
B



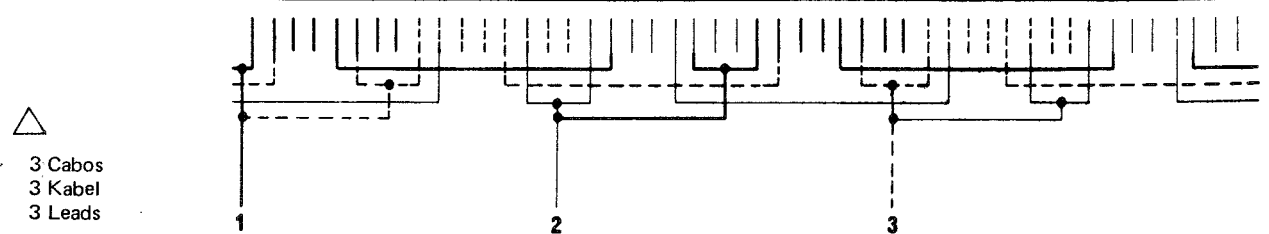
C



D



E



F

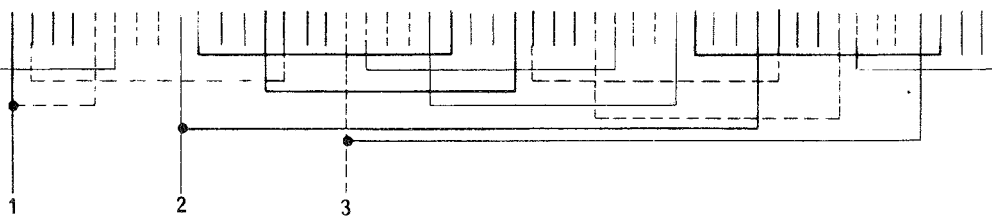
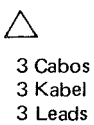
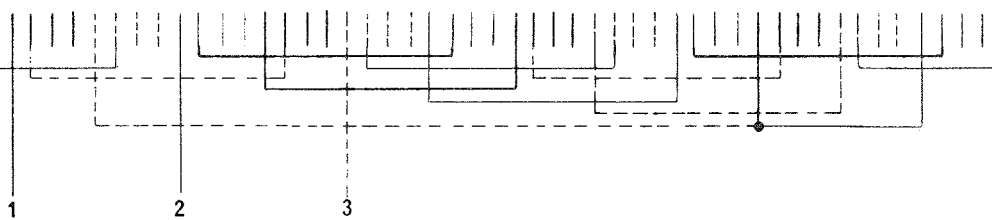
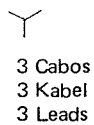
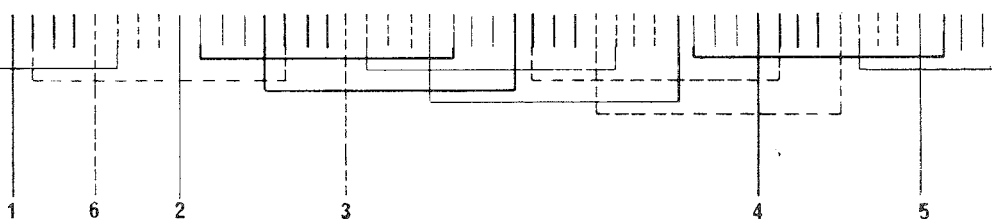
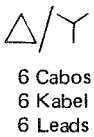
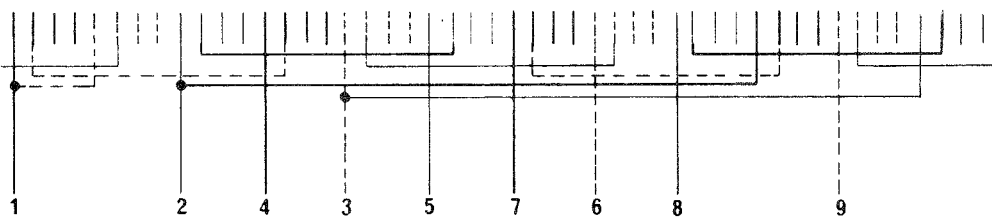
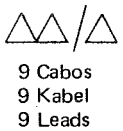
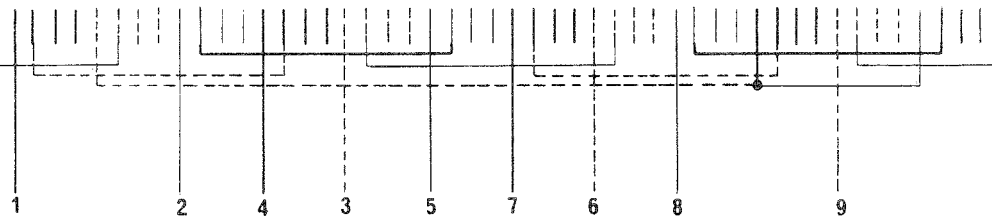
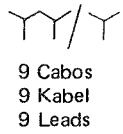
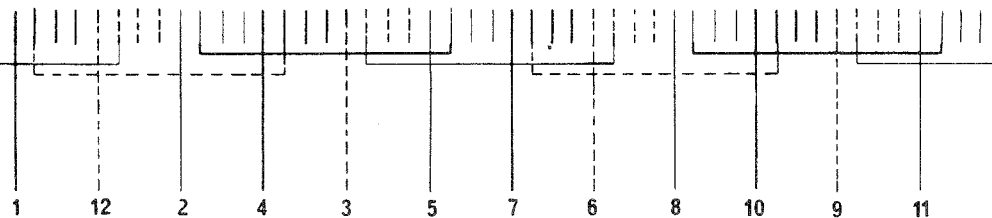
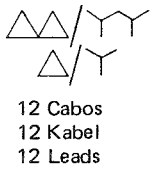
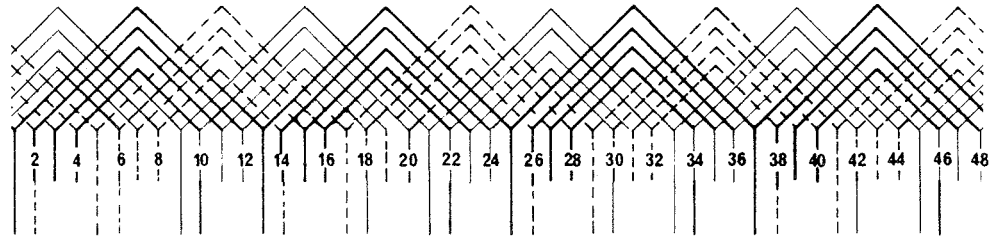
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 04 - 10/1  
(48-004-10/121-N)\*

TRIFÁSICO	48 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:7:9 :11:13
DREHSTROM	48 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:7:9 :11:13
THREE-PHASE	48 SLOTS	4 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:7:9 :11:13

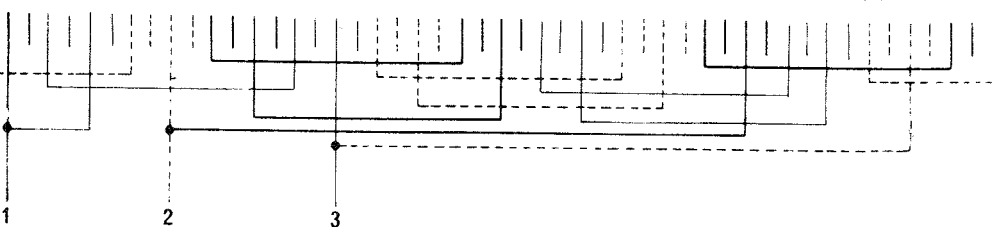
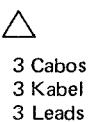
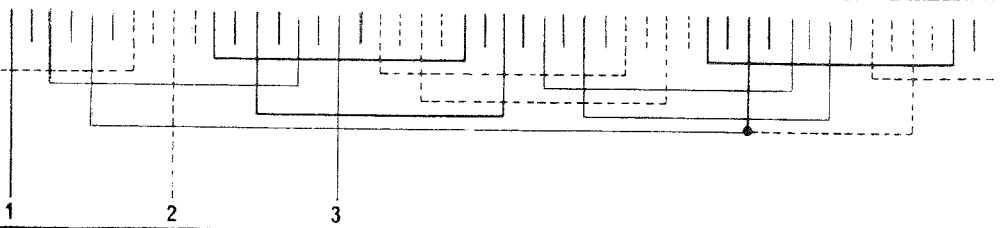
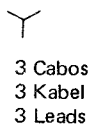
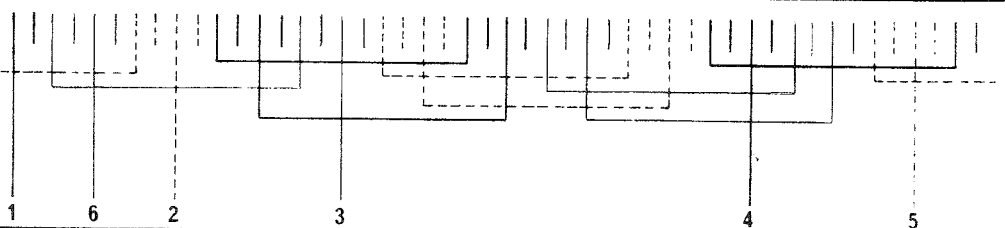
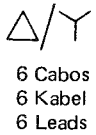
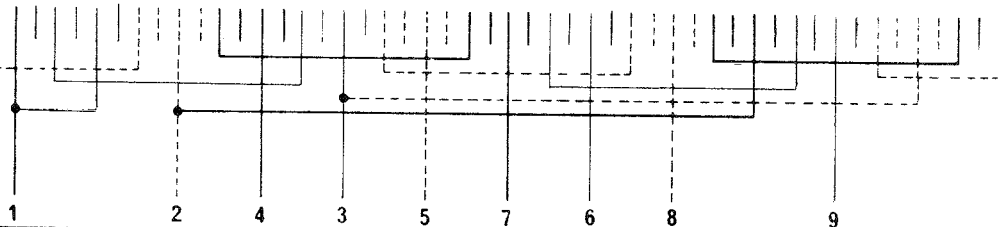
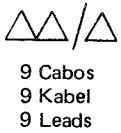
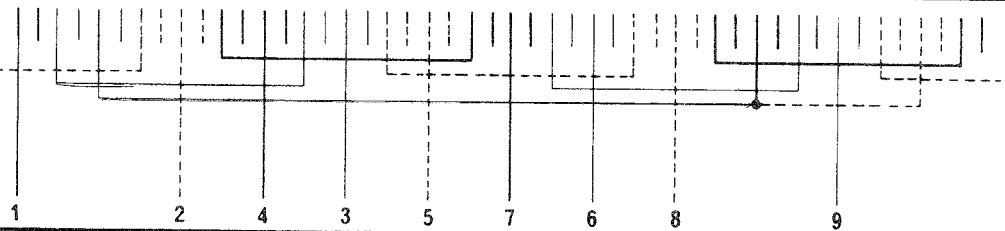
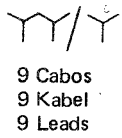
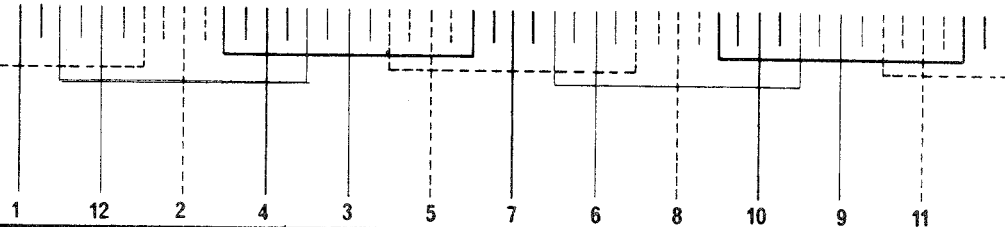
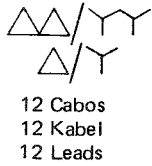
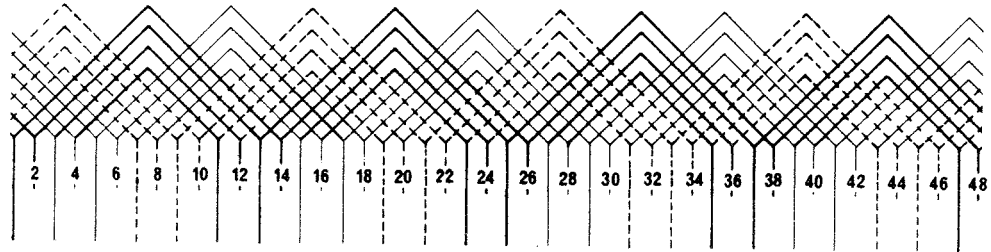


48 - 04 - 11/1  
(48-004-11/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	48 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:8:10 :12:14
DREHSTROM	48 NUTEN	4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL- 1:8:10 SCHRITT :12:14
THREE-PHASE	48 SLOTS	4 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:8:10 :12:14



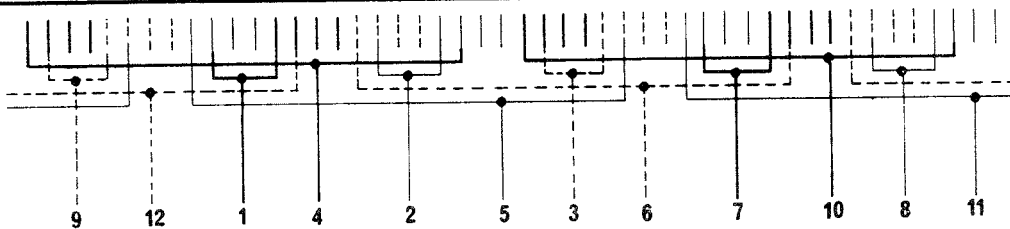
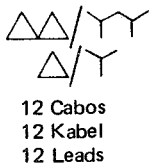
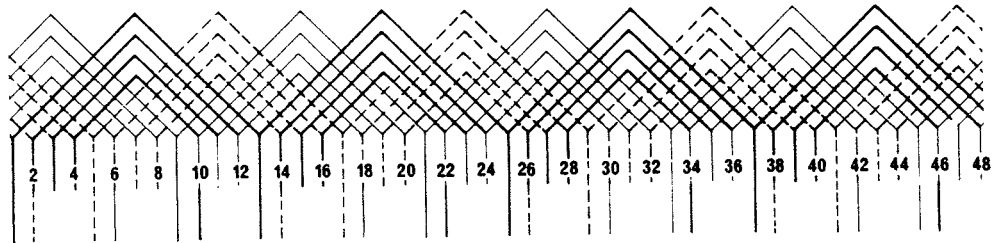
\*Nova nomenclatura



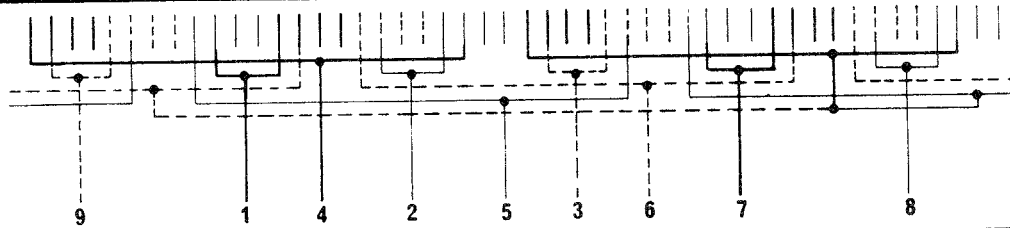
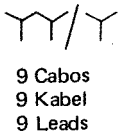
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 04 - 10/2  
(48-004-10/221-N)\*

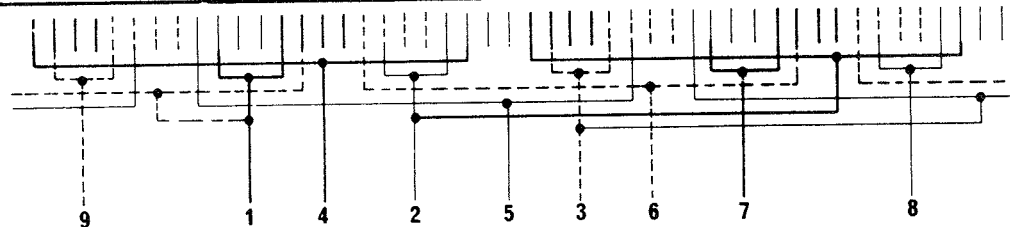
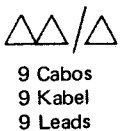
TRIFÁSICO	48 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:7:9 :11:13
DREHSTROM	48 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:7:9 :11:13
THREE-PHASE	48 SLOTS	4 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:7:9 :11:13



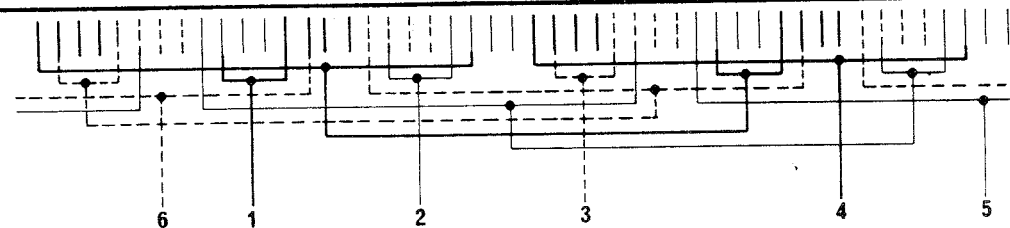
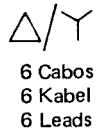
A



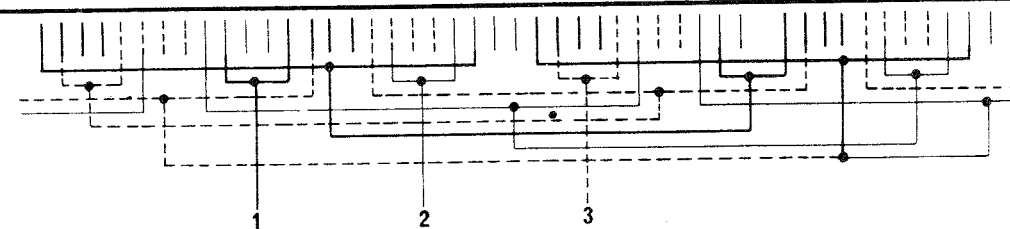
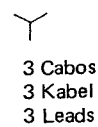
B



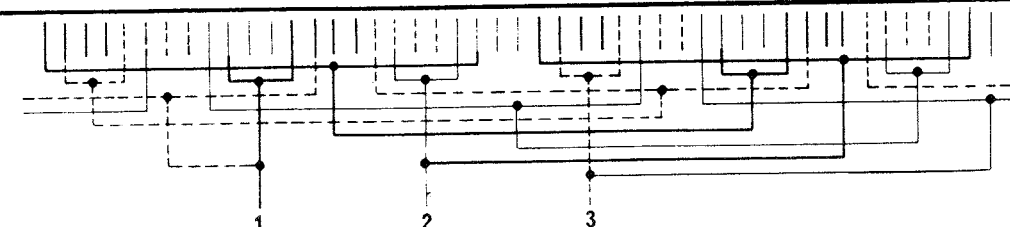
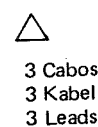
C



D



E



F

48 - 04 - 11/2  
(48-004-11/221-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

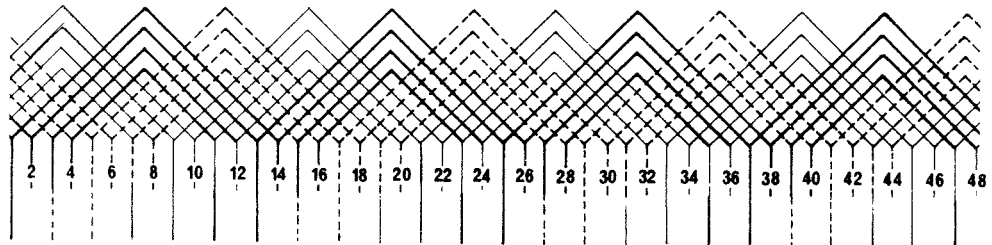
48 RANHURAS  
48 NUTEN  
48 SLOTS

4 POLOS  
4 POLE  
4 POLES

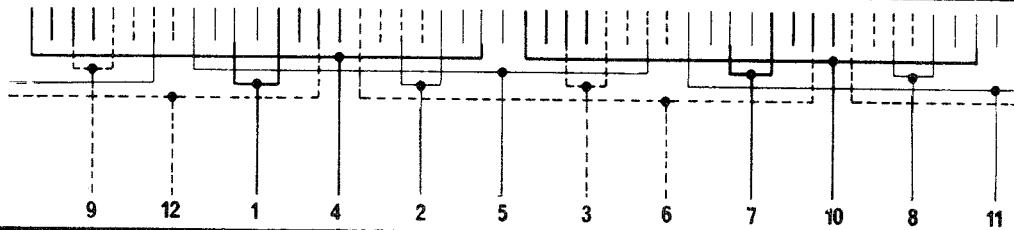
CAMADA DUPLA  
DOPPEL-  
SCHICHT  
TWO LAYER

CONCÊNTRICO  
PARALELO  
KONZENTRISCHE  
PARALLEL  
PARALLEL  
CONCENTRIC

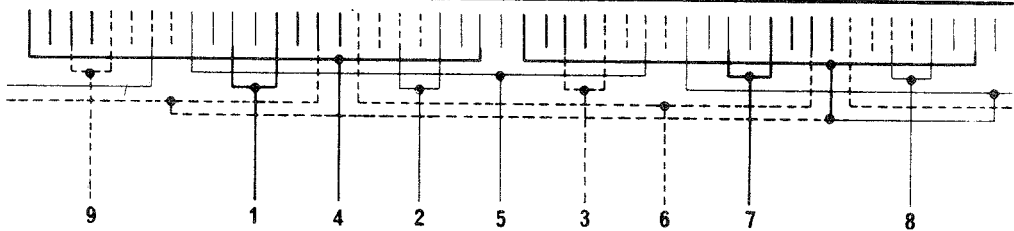
PASSO 1:8:10  
:12:14  
WICKEL- 1:8:10  
SCHRITT :12:14  
PITCH 1:8:10  
:12:14



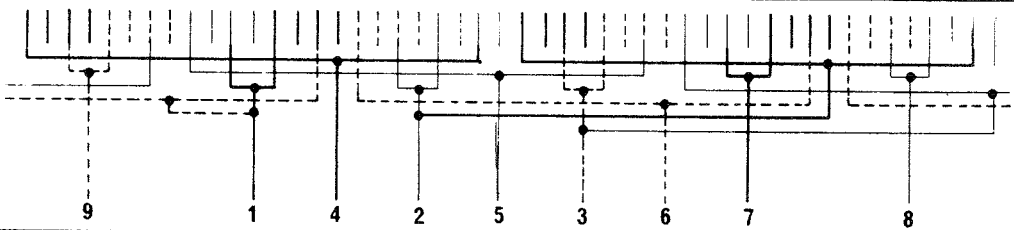
$\Delta/Y$   
12 Cabos  
12 Kabel  
12 Leads



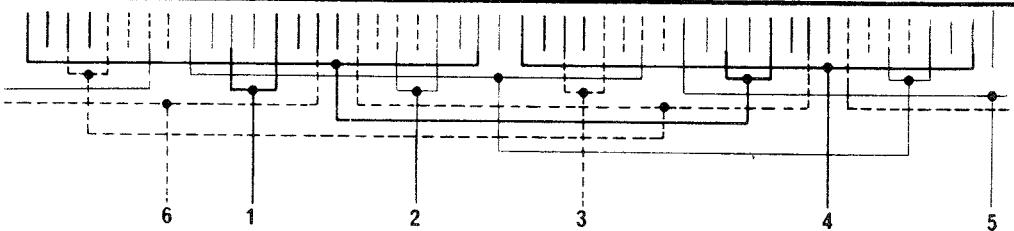
$Y/Y$   
9 Cabos  
9 Kabel  
9 Leads



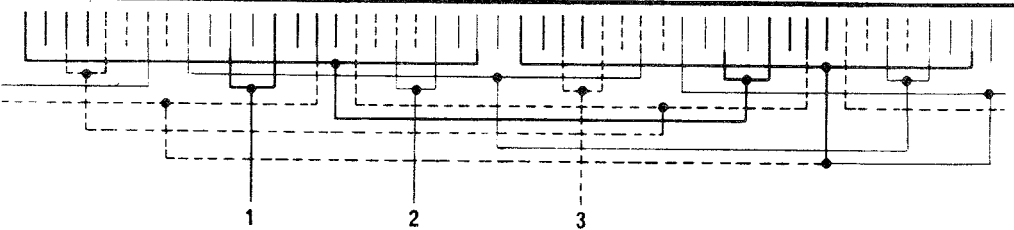
$\Delta/\Delta$   
9 Cabos  
9 Kabel  
9 Leads



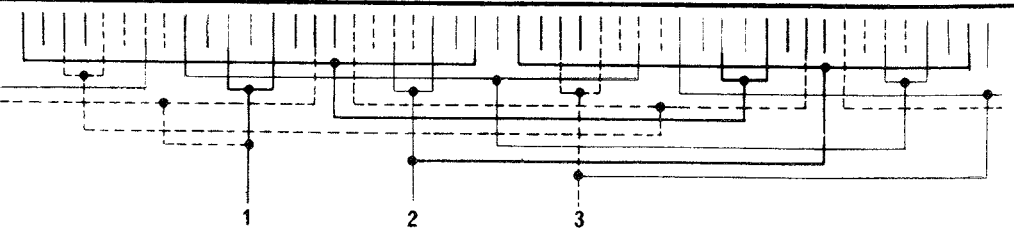
$\Delta/Y$   
6 Cabos  
6 Kabel  
6 Leads



$Y$   
3 Cabos  
3 Kabel  
3 Leads



$\Delta$   
3 Cabos  
3 Kabel  
3 Leads



\*Nova nomenclatura

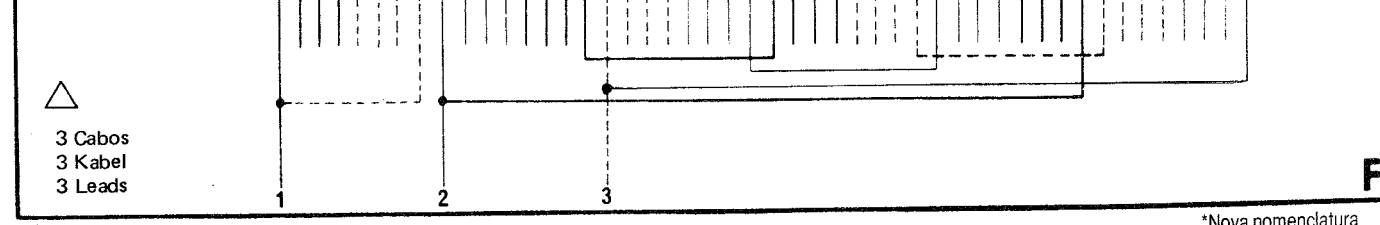
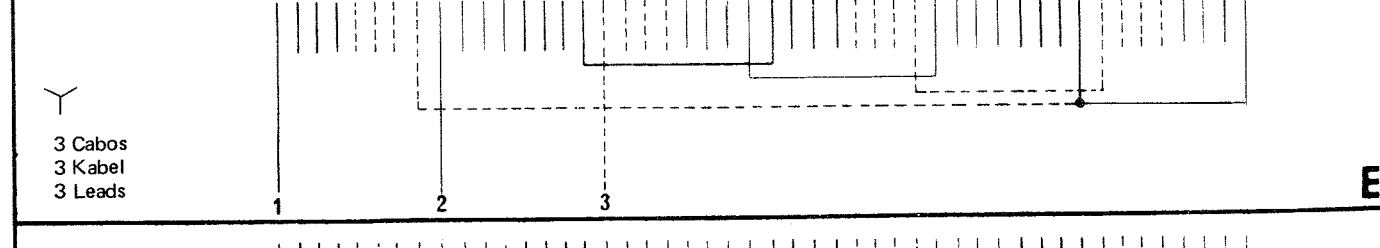
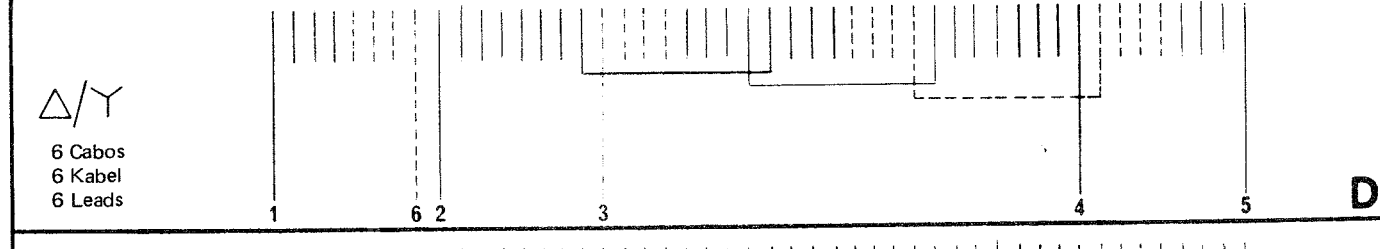
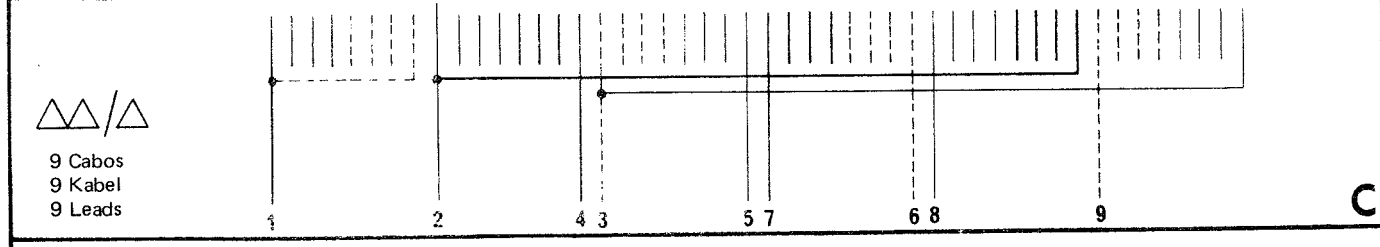
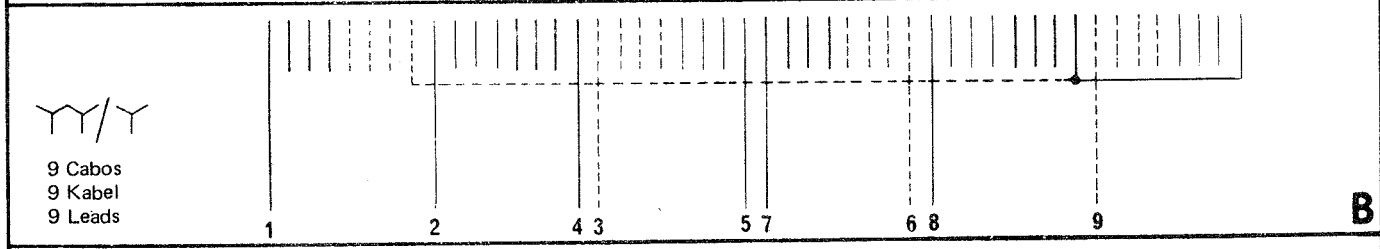
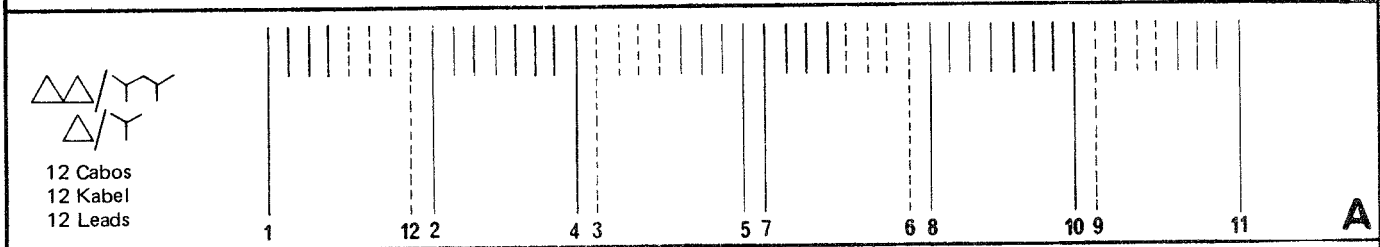
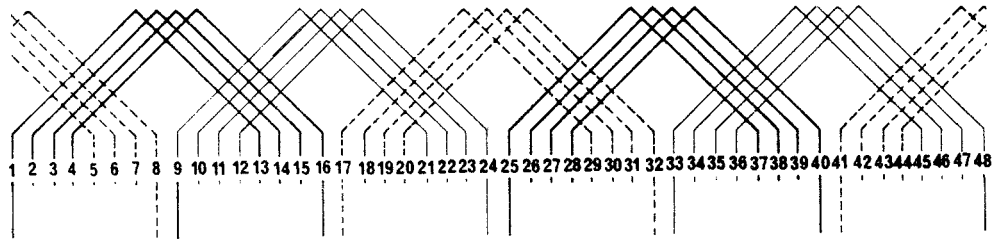




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 04 - 13/1  
(48-004-13/112-N)\*

TRIFÁSICO	48 RANHURAS	4 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:13
DREHSTROM	48 NUTEN	4 POLE	EINZEL-SCHICHT	TRÄUFEL-WICKLUNG SERIE	WICKEL-SCHRITT 1:13
THREE-PHASE	48 SLOTS	4 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:13



48 - 04 - 13/2  
(48-004-13/211-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

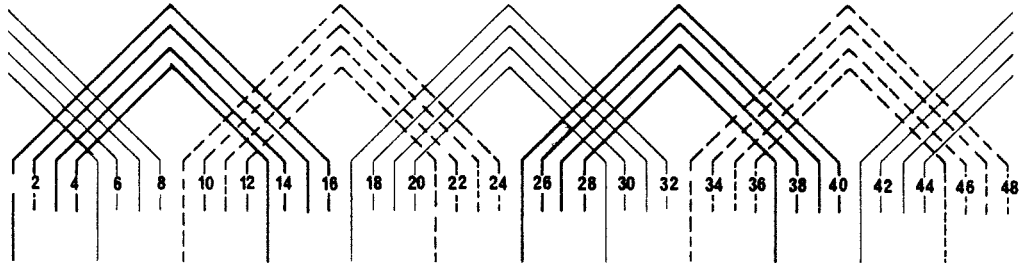
48 RANHURAS  
48 NUTEN  
48 SLOTS

4 POLOS  
4 POLE  
4 POLES

CAMADA ÚNICA  
EINZEL-SCHICHT  
SINGLE LAYER

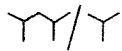
CONCÊNTRICO PARALELO  
KONZENTRISCHE PARALLEL  
PARALLEL CONCENTRIC

PASSO 1:10:12  
:14:16  
WICKEL- 1:10:12  
SCHRITT :14:16  
PITCH 1:10:12  
:14:16



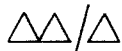
12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

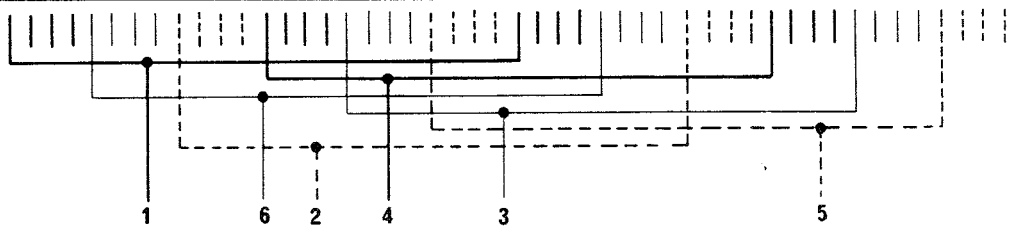


9 Cabos  
9 Kabel  
9 Leads

C



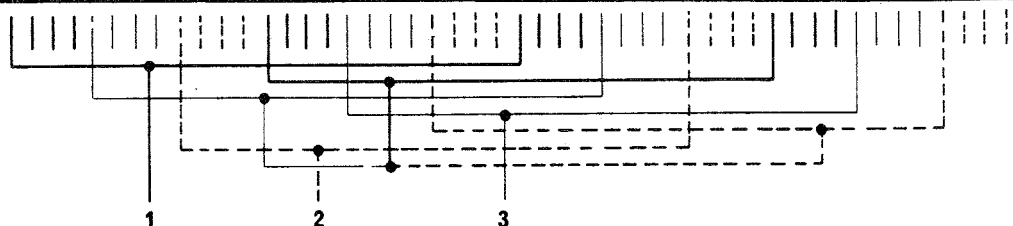
6 Cabos  
6 Kabel  
6 Leads



D



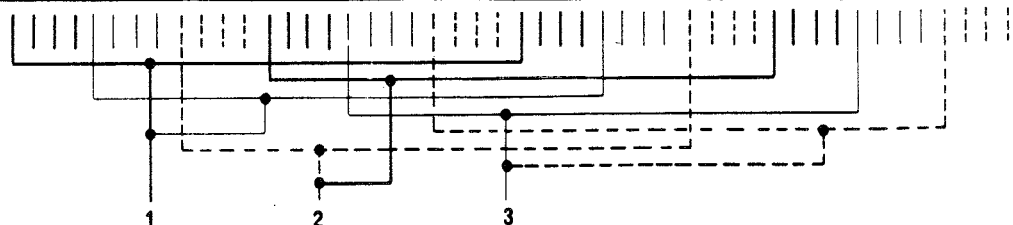
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

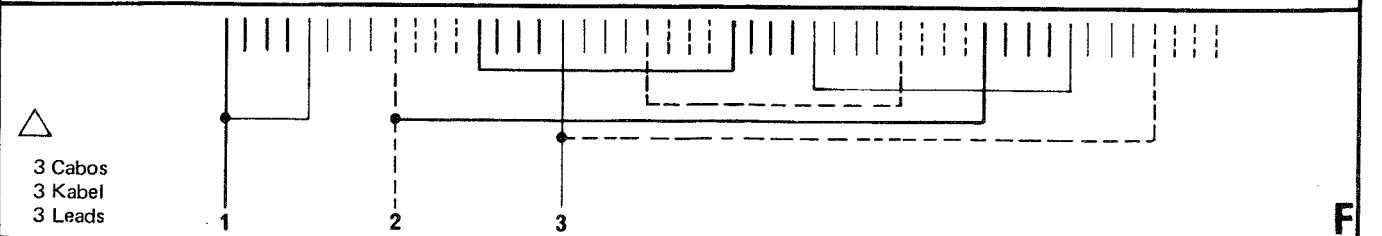
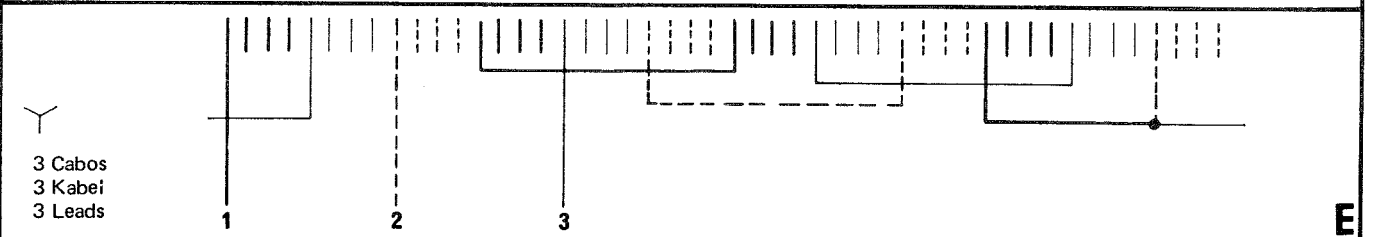
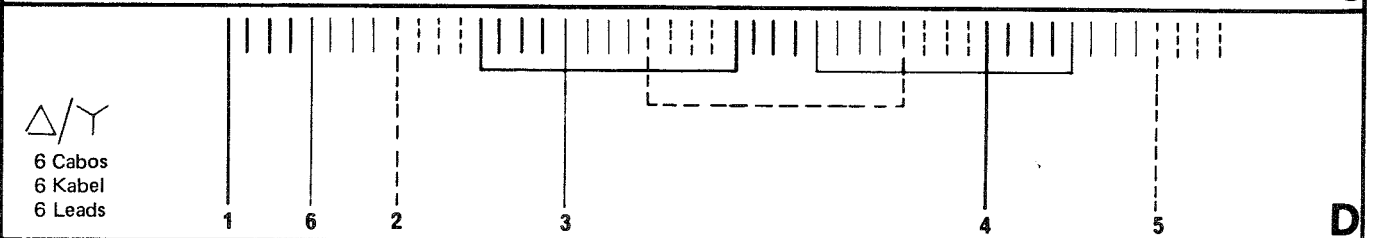
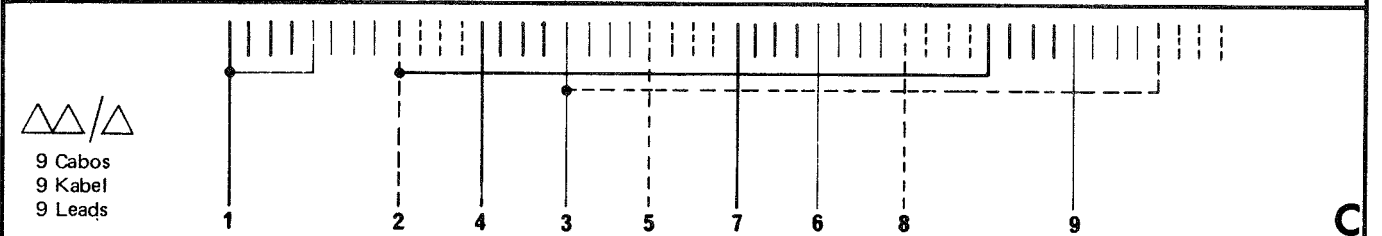
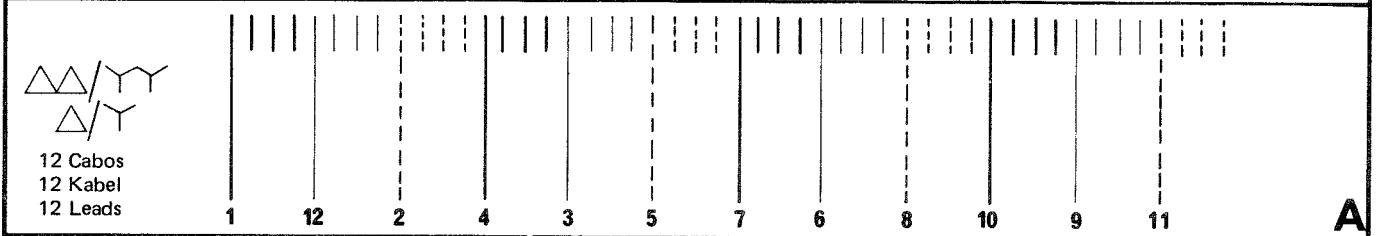
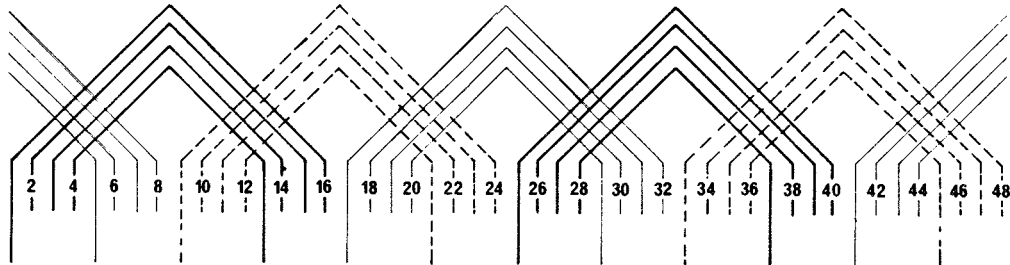
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 04 - 13/3  
(48-004-13/111-N)\*

TRIFÁSICO	48 RANHURAS	4 POLOS	CAMADA ÚNICA	CONCÊNTRICO SÉRIE	PASSO 1:10:12 :14:16
DREHSTROM	48 NUTEN	4 POLE	EINZEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL 1:10:12 SCHRITT :14:16
THREE-PHASE	48 SLOTS	4 POLES	SINGLE LAYER	SERIES CONCENTRIC	PITCH 1:10:12 :14:16



48 - 06 - 07/1  
(48-006-07/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

48 RANHURAS

6 POLOS

CAMADA  
DUPLA

IMBRICADO  
SÉRIE

PASSO 1:7

DREHSTROM

48 NUTEN

6 POLE

DOPPEL-  
SCHICHT

TRAUFEL-  
WICKLUNG  
SERIE

WICKEL-  
SCHRITT 1:7

THREE-PHASE

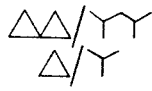
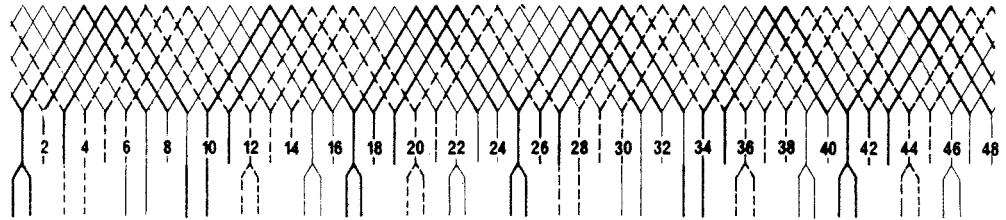
48 SLOTS

6 POLES

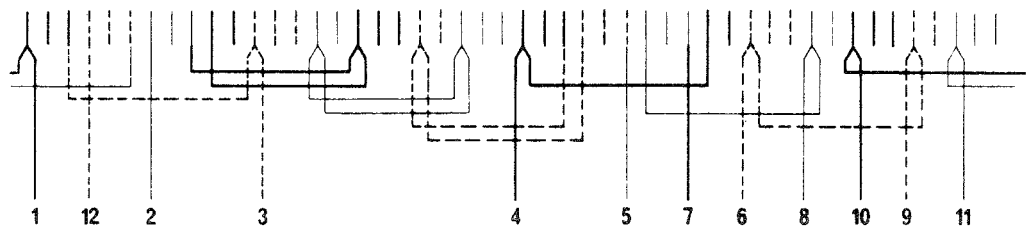
TWO LAYER

SERIES LAP

PITCH 1:7



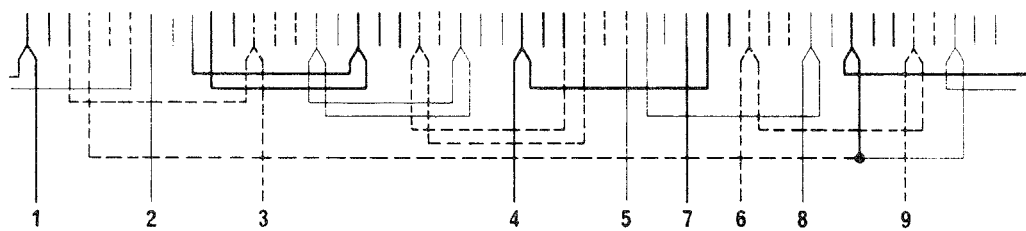
12 Cabos  
12 Kabel  
12 Leads



A



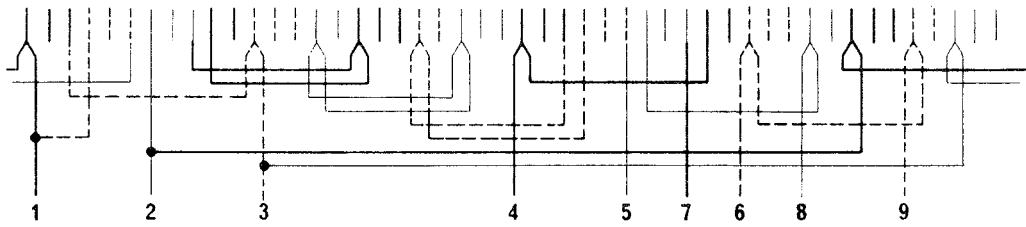
9 Cabos  
9 Kabel  
9 Leads



B



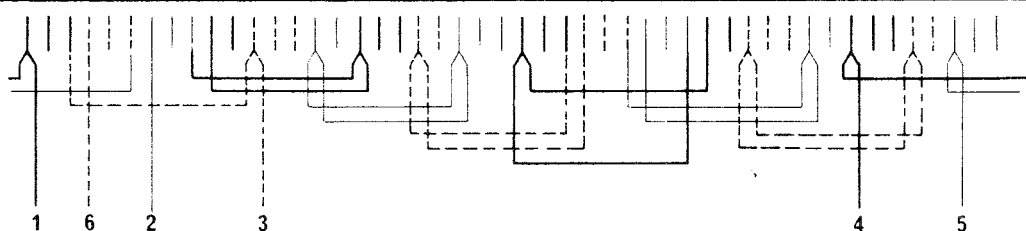
9 Cabos  
9 Kabel  
9 Leads



C



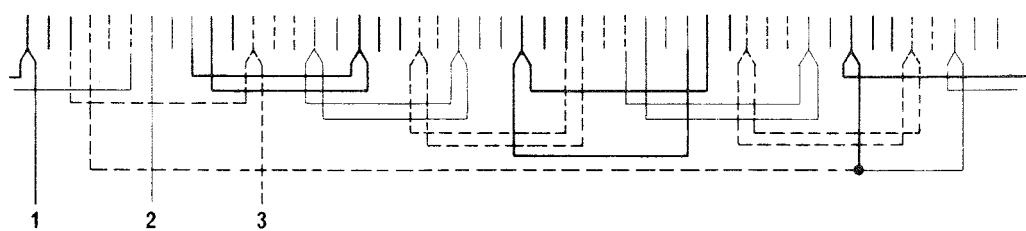
6 Cabos  
6 Kabel  
6 Leads



D



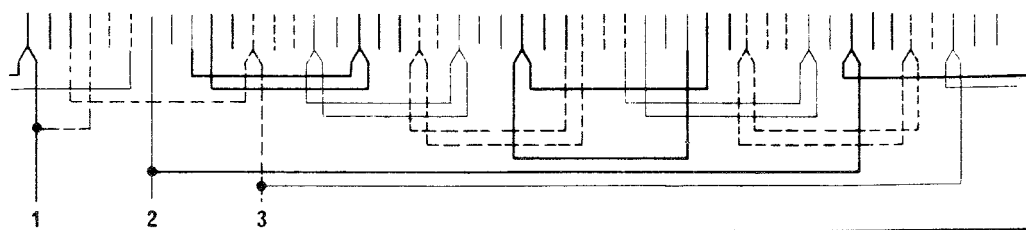
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

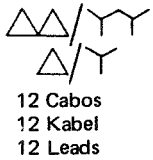
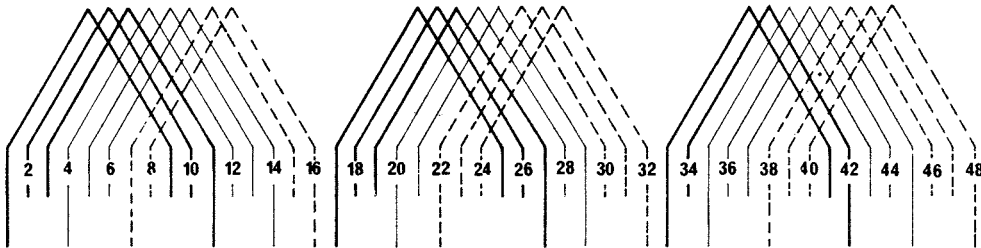
\*Nova nomenclatura



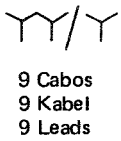
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 06 - 09/2  
(48-006-09/112-N)\*

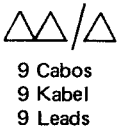
TRIFÁSICO	48 RANHURAS	6 POLOS	CAMADA ÚNICA	IMBRICADO SÉRIE	PASSO 1:9
DREHSTROM	48 NUTEN	6 POLE	EINZEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:9
THREE-PHASE	48 SLOTS	6 POLES	SINGLE LAYER	SERIES LAP	PITCH 1:9



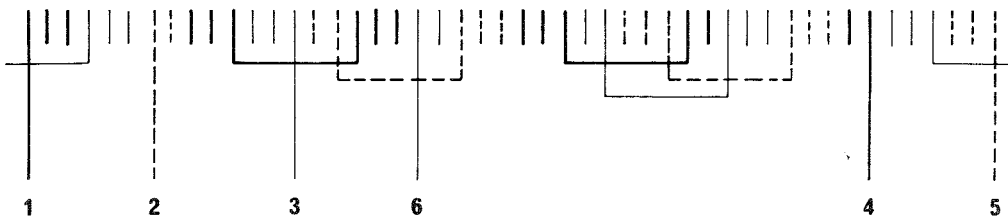
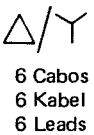
A



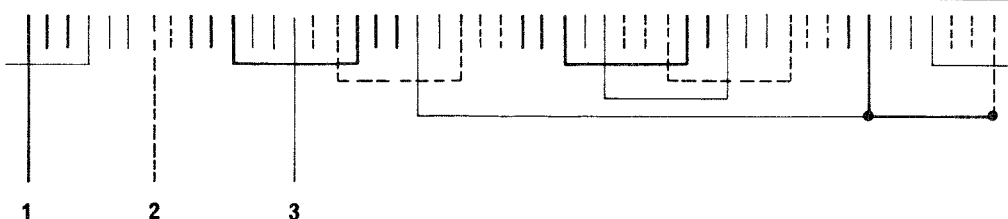
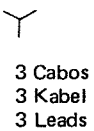
B



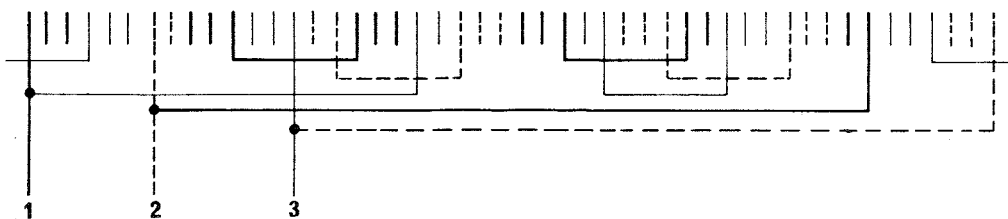
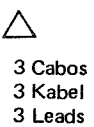
C



D



E



F

48 - 08 - 06/1  
(48-008-06/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

48 RANHURAS

8 POLOS

CAMADA  
DUPLA

IMBRICADO  
SÉRIE

PASSO 1:6

DREHSTROM

48 NUTEN

8 POLE

DOPPEL-  
SCHICHT

TRÄUFEL-  
WICKLUNG  
SERIE

WICKEL-  
SCHRITT 1:6

THREE-PHASE

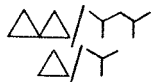
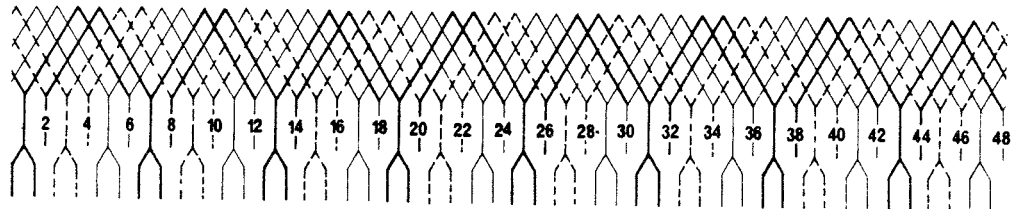
48 SLOTS

8 POLES

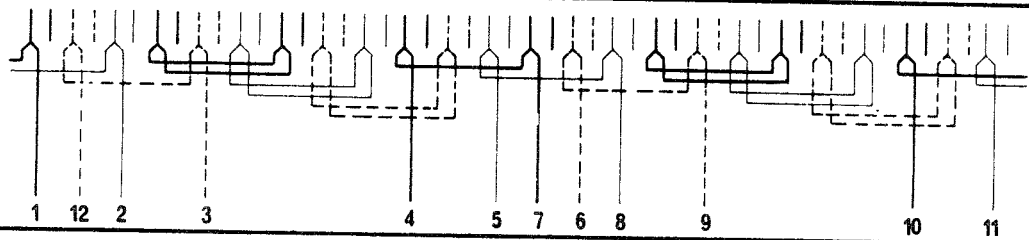
TWO LAYER

SERIES LAP

PITCH 1:6



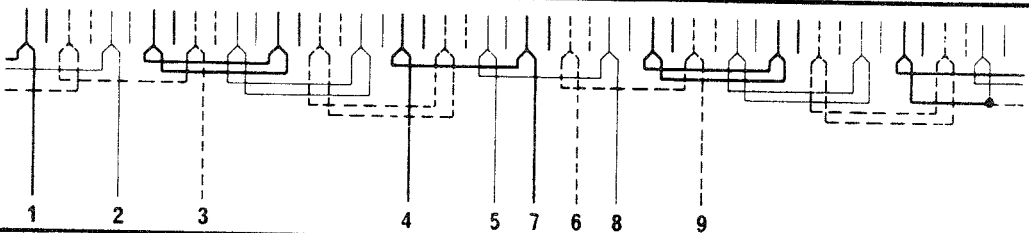
12 Cabos  
12 Kabel  
12 Leads



A



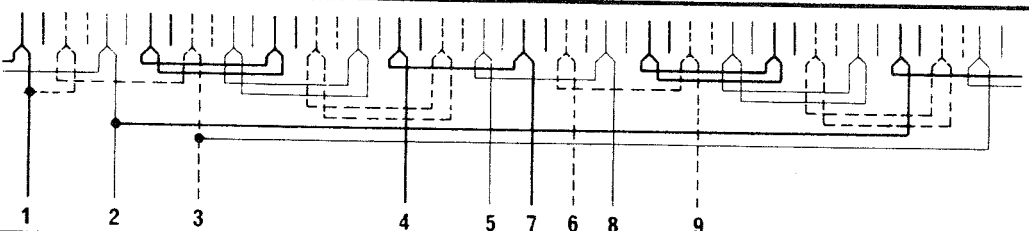
9 Cabos  
9 Kabel  
9 Leads



B



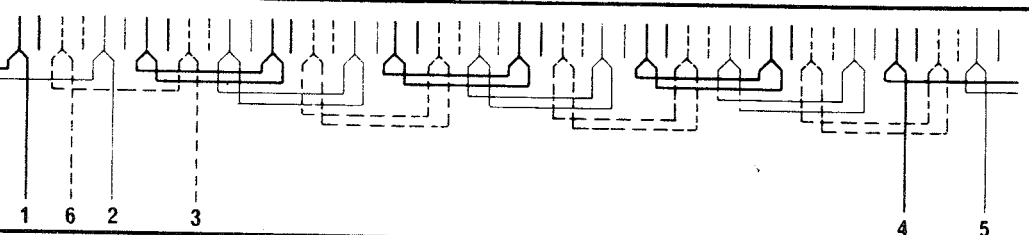
9 Cabos  
9 Kabel  
9 Leads



C



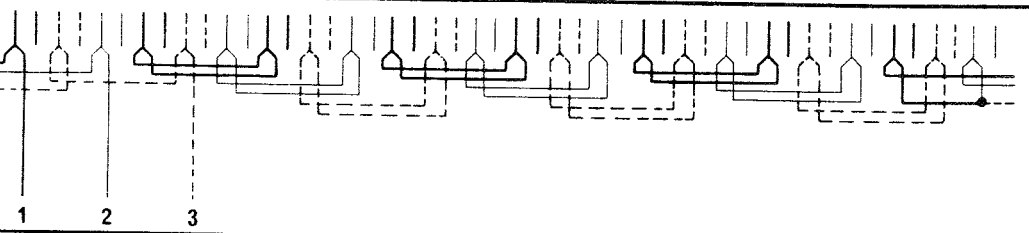
6 Cabos  
6 Kabel  
6 Leads



D



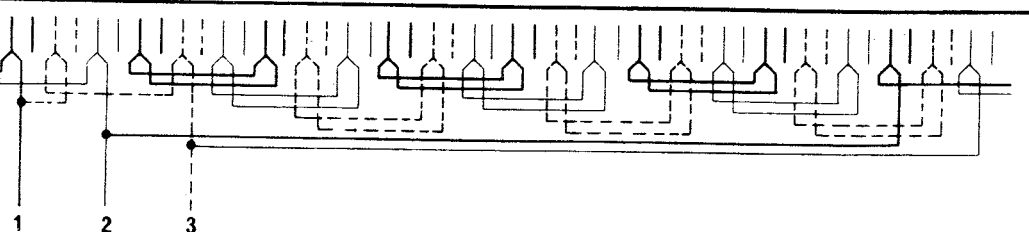
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

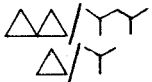
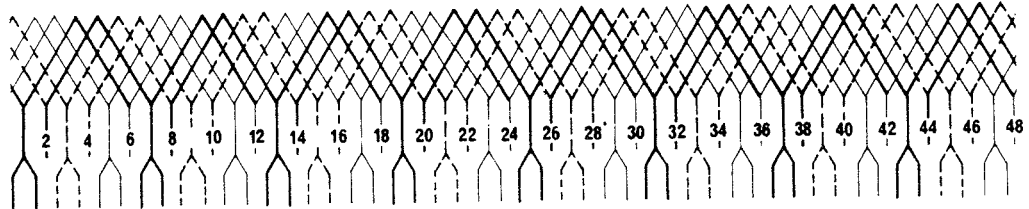
\*Nova nomenclatura



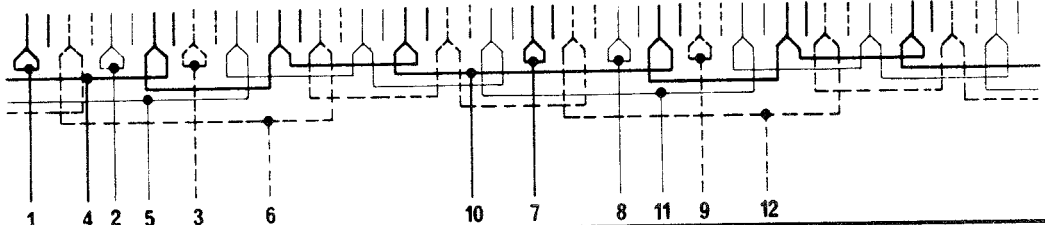
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 08 - 06/2  
(48-008-06/222-N)\*

TRIFÁSICO	48 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:6
DREHSTROM	48 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:6
THREE-PHASE	48 SLOTS	8 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:6



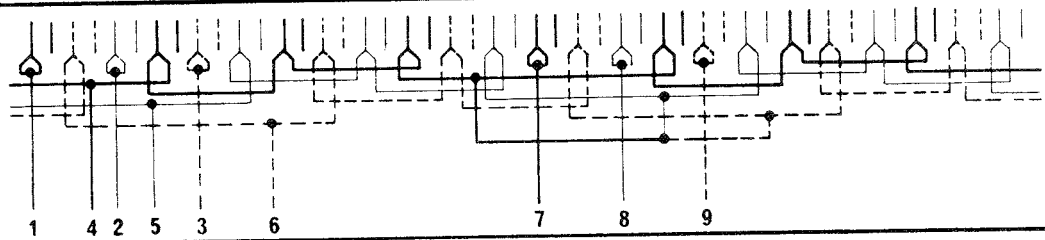
12 Cabos  
12 Kabel  
12 Leads



A



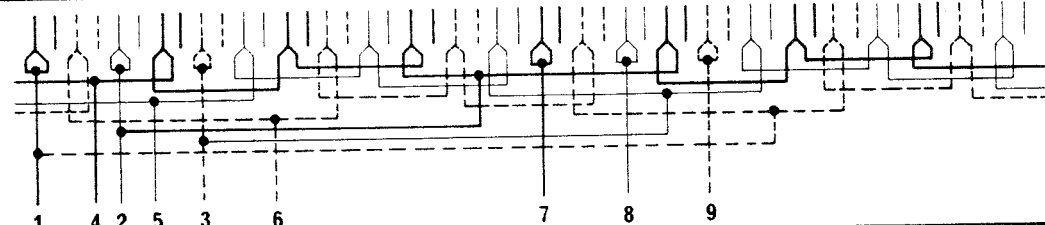
9 Cabos  
9 Kabel  
9 Leads



B



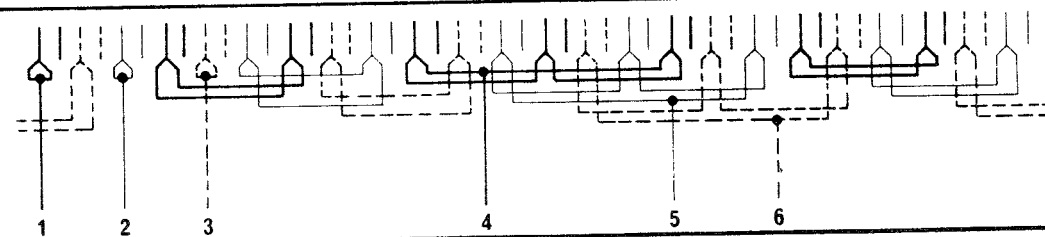
9 Cabos  
9 Kabel  
9 Leads



C



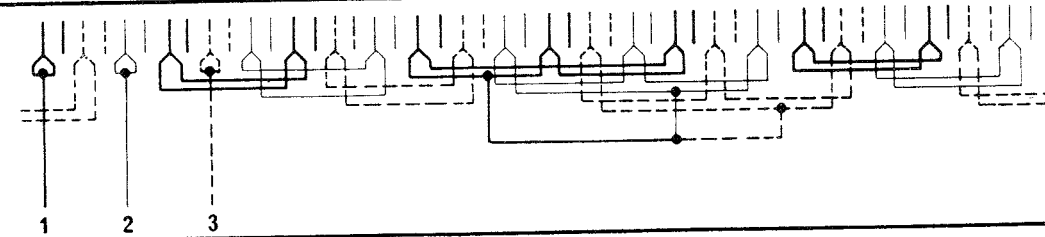
6 Cabos  
6 Kabel  
6 Leads



D



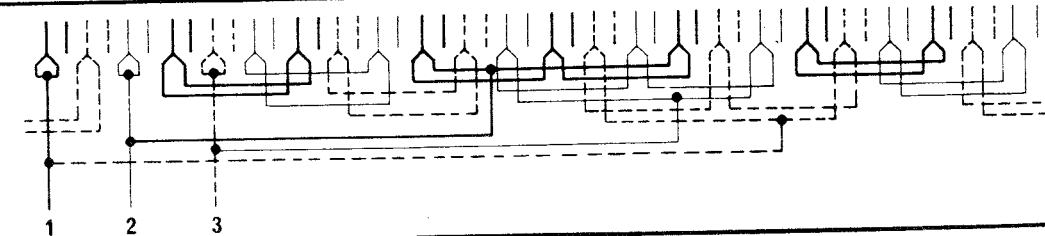
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

48 - 08 - 07/1  
(48-008-07/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

48 RANHURAS

8 POLOS

CAMADA DUPLA

IMBRICADO SÉRIE

PASSO 1:7

DREHSTROM

48 NUTEN

8 POLE

DOPPEL-SCHICHT

TRÄUFEL-WICKLUNG SÉRIE

WICKEL-SCHRITT 1:7

THREE-PHASE

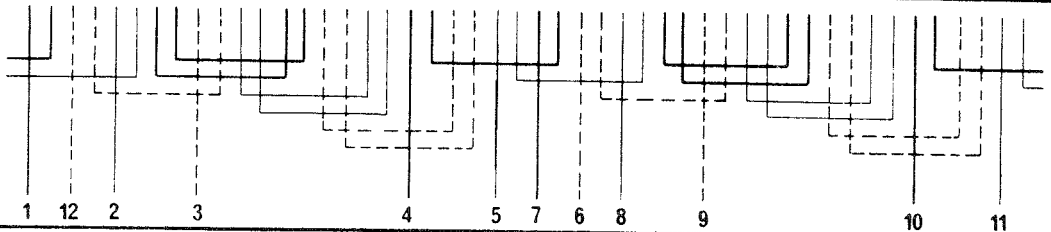
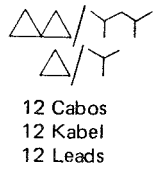
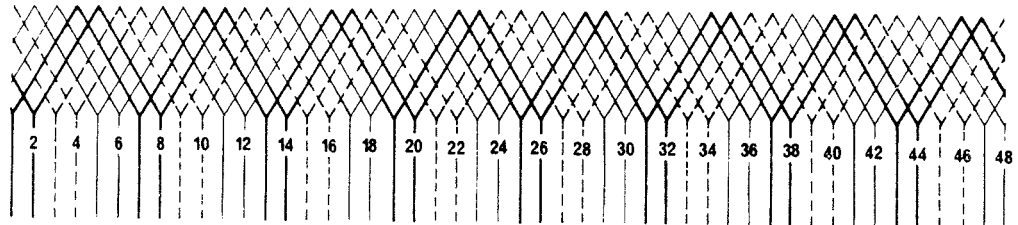
48 SLOTS

8 POLES

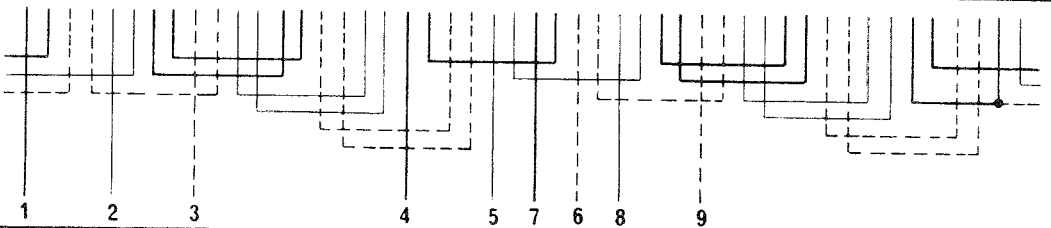
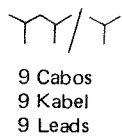
TWO LAYER

SERIES LAP

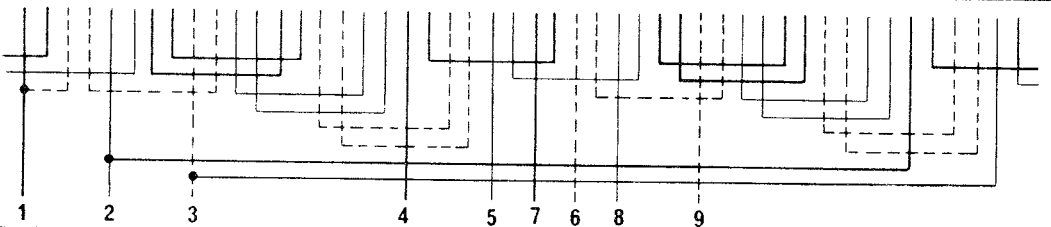
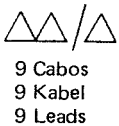
PITCH 1:7



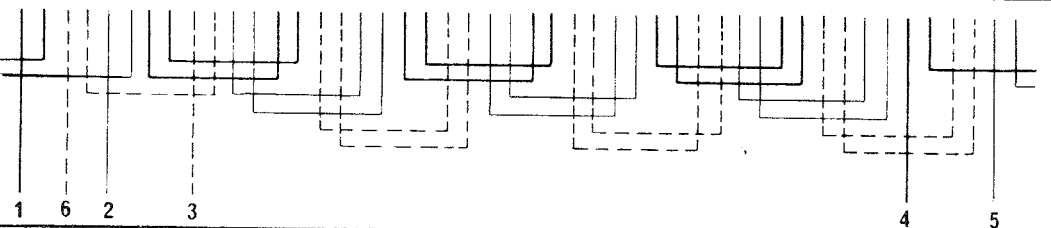
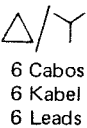
**A**



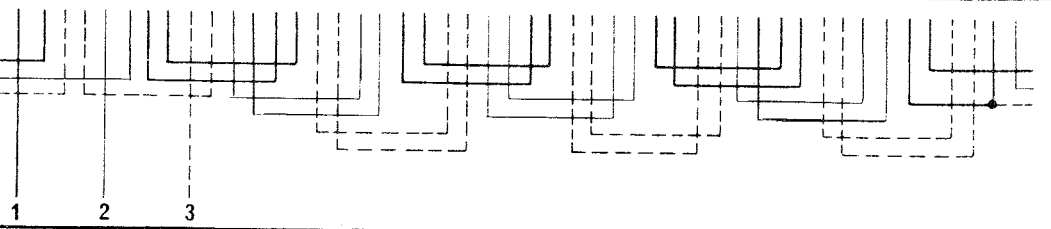
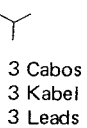
**B**



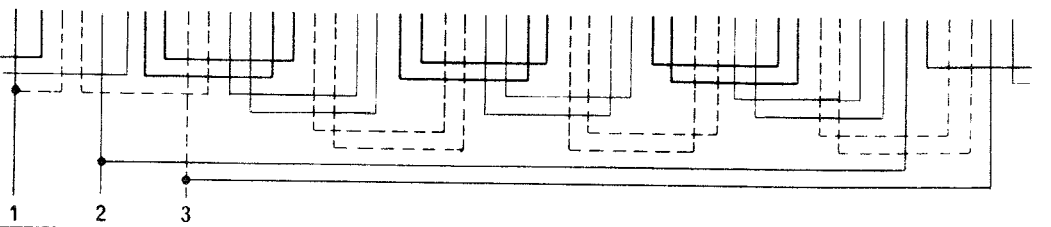
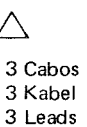
**C**



**D**



**E**



**F**

\*Nova nomenclatura

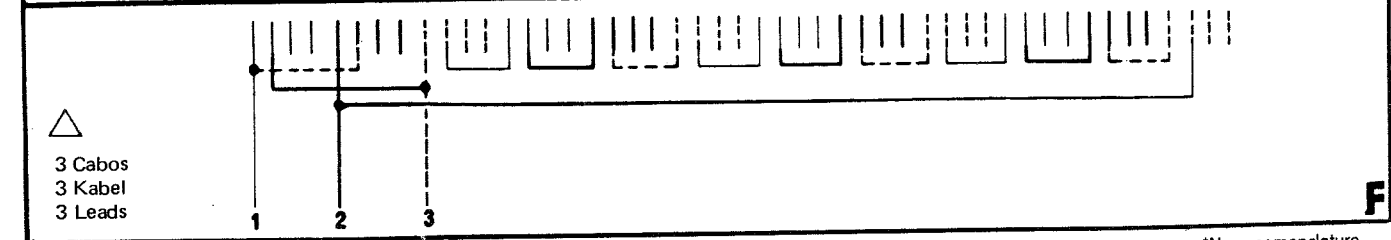
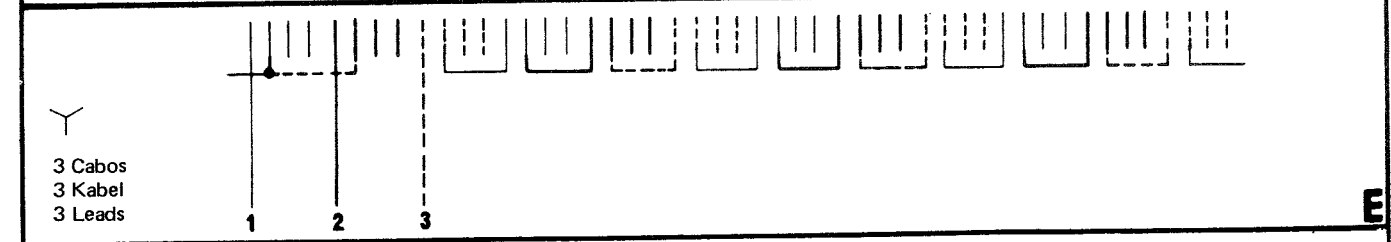
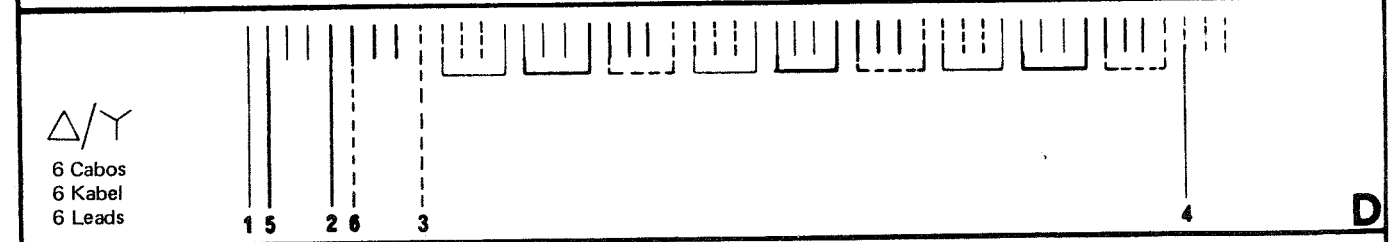
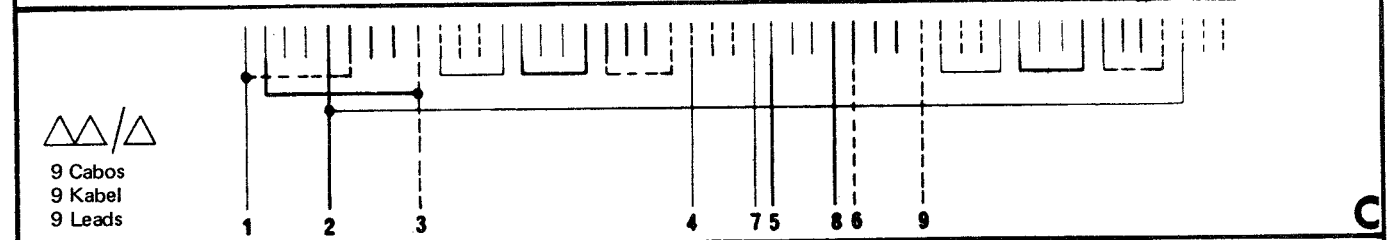
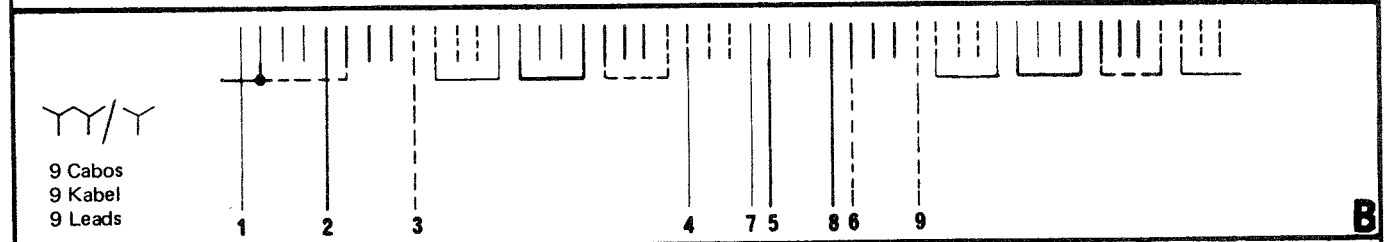
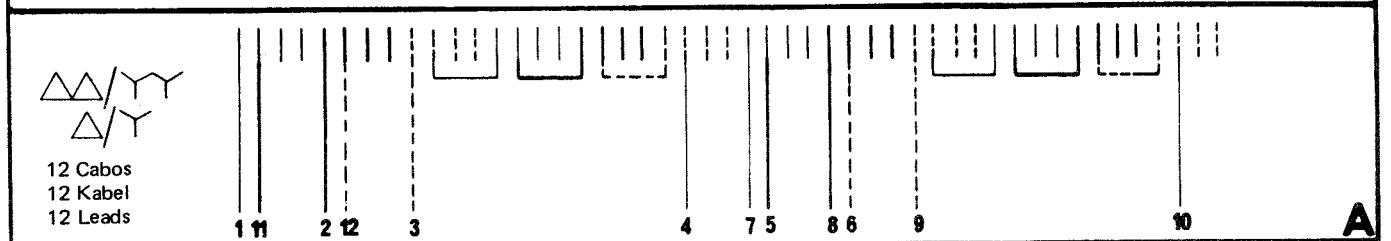
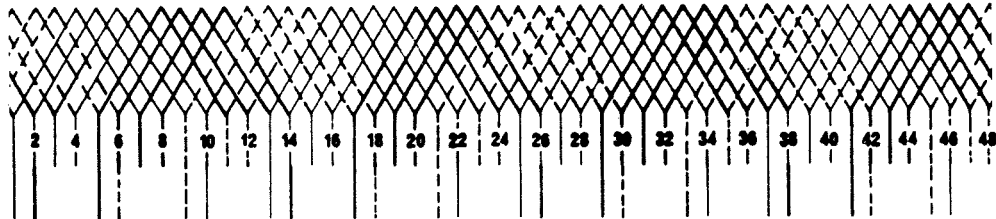




**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

48 - 08 - 07/2  
(48-008-07/123-N)\*

TRIFÁSICO	48 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:7
DREHSTROM	48 NUTEN	8 POLOS	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SERIE	WICKEL-SCHRITT 1:7
THREE-PHASE	48 SLOTS	8 POLES	TWO LAYER	SERIES LAP	PITCH 1:7

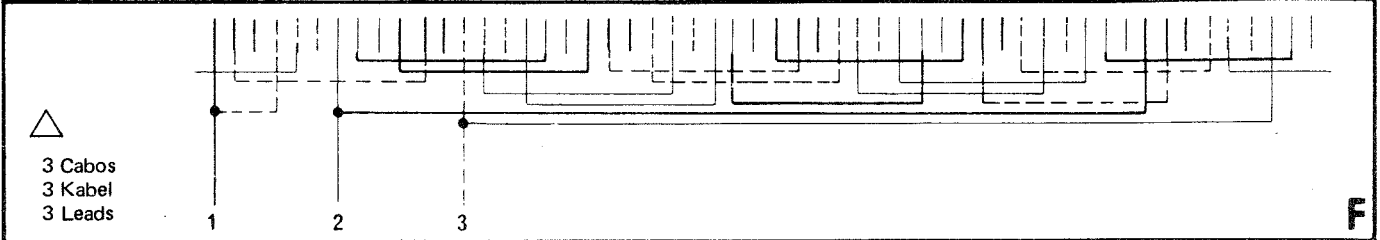
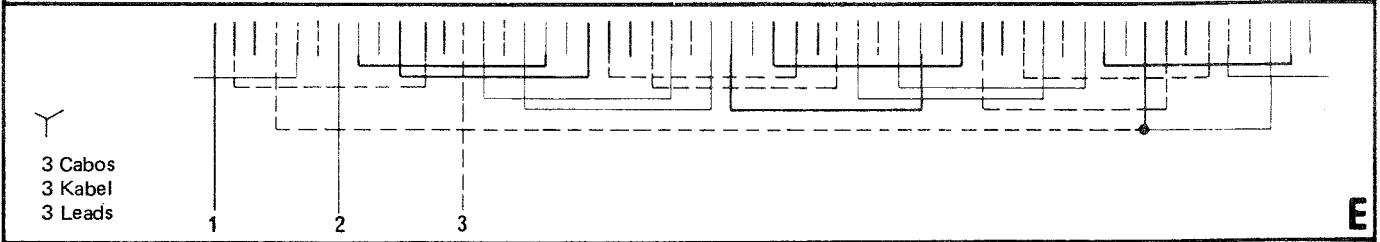
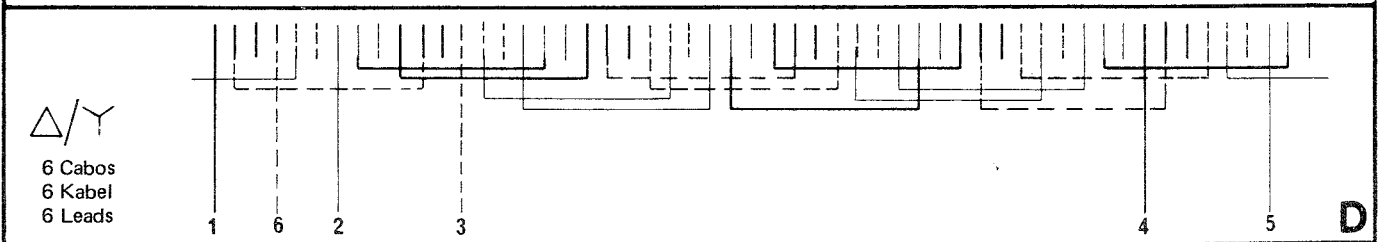
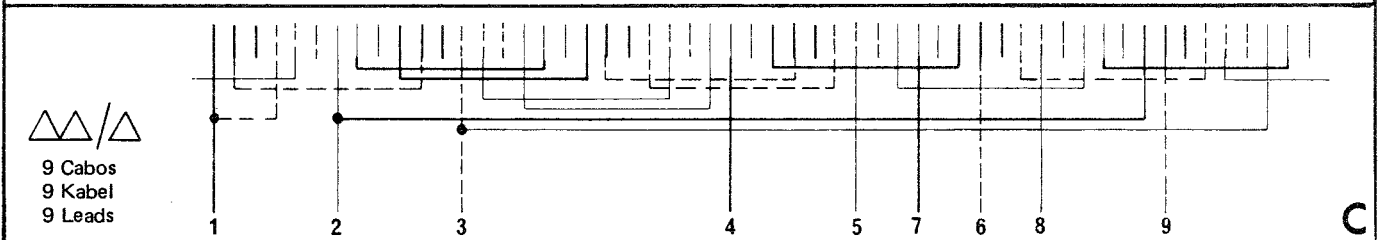
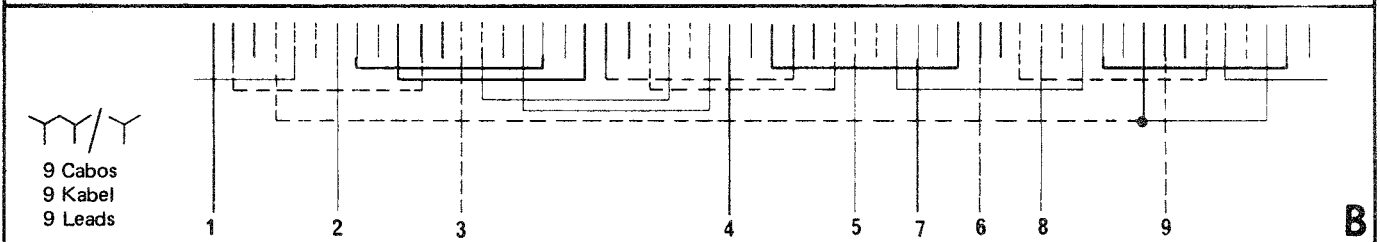
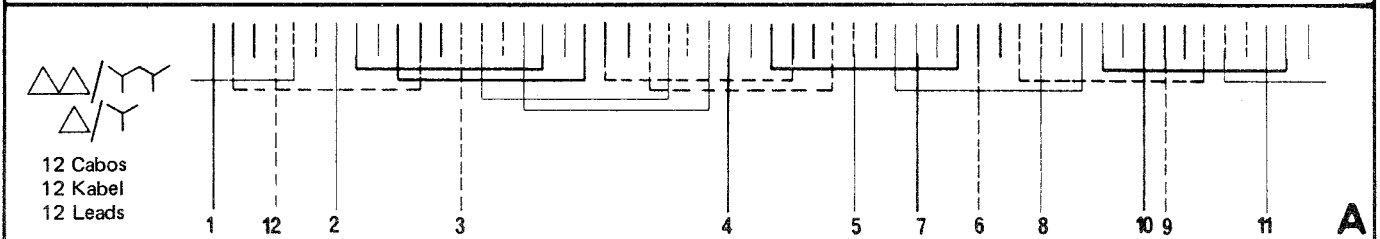
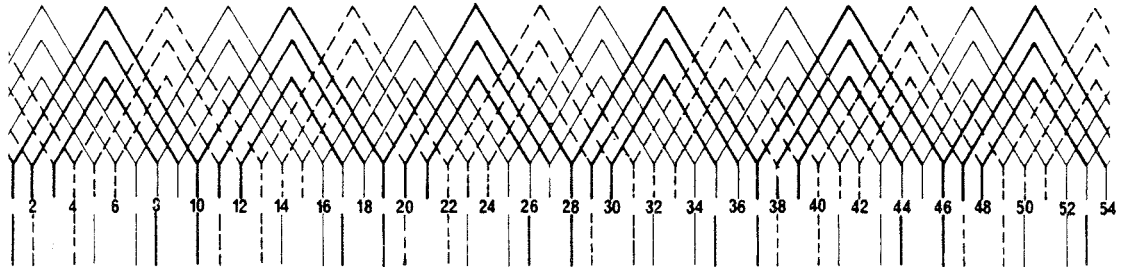


54 - 06 - 08/1  
(54-006-08/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	54 RANHURAS	6 POLOS	CAMADA DUPLA	CÔNCÊNTRICO SÉRIE	PASSO 1:6:8:10
DREHSTROM	54 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	54 SLOTS	6 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:6:8:10



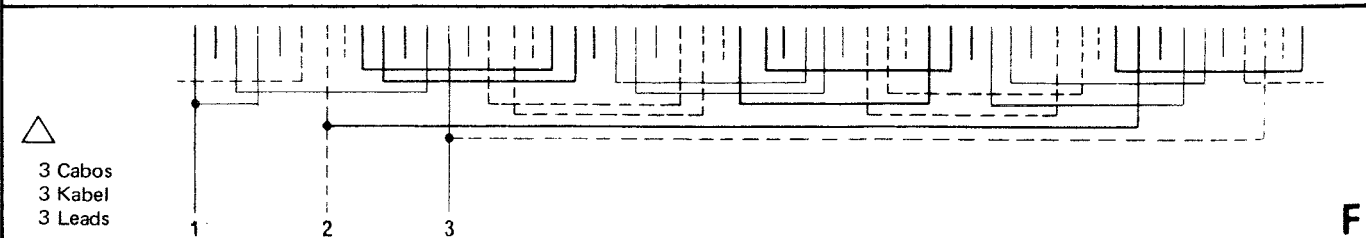
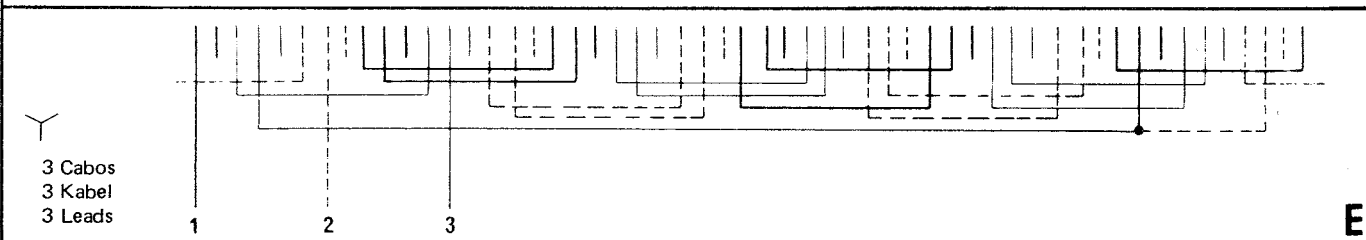
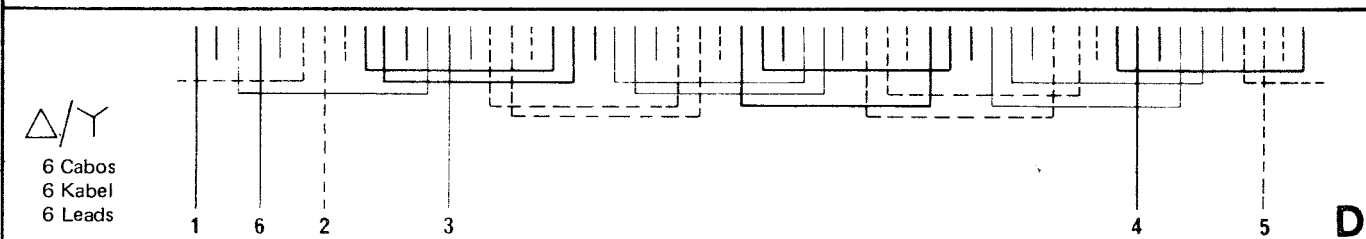
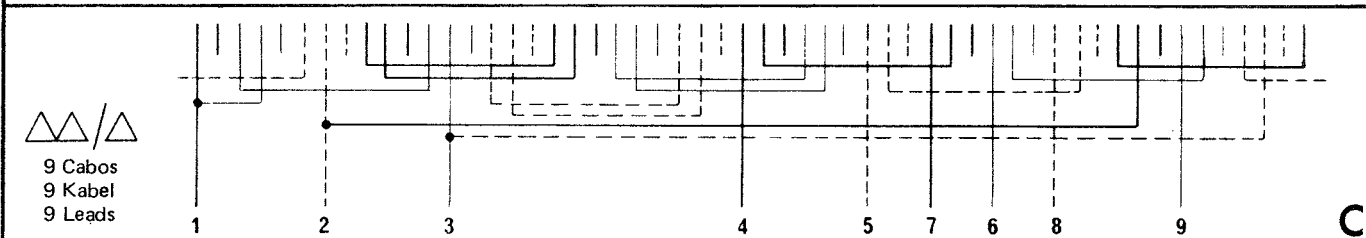
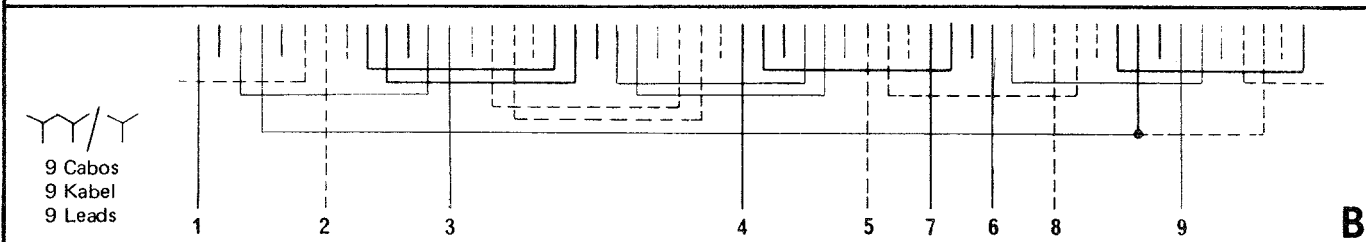
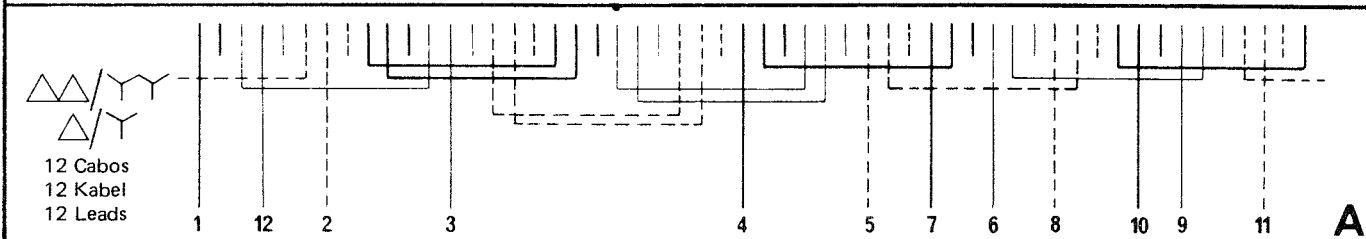
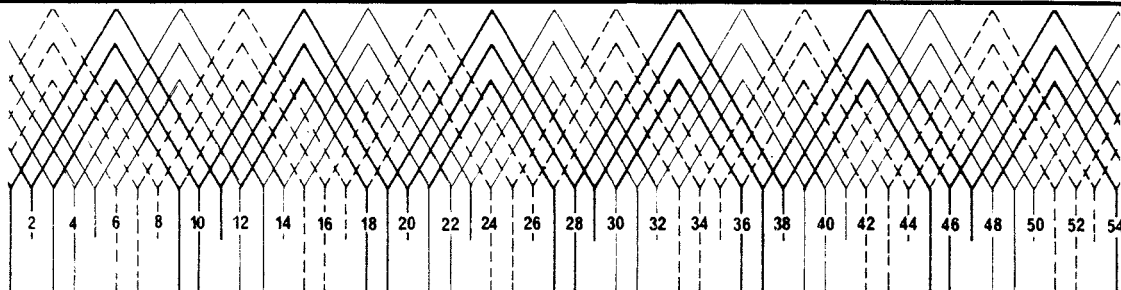
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

54 - 06 - 09/1  
(54-006-09/121-N)\*

TRIFÁSICO	54 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:7:9:11
DREHSTROM	54 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:7:9:11
THREE-PHASE	54 SLOTS	6 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:7:9:11

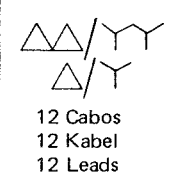
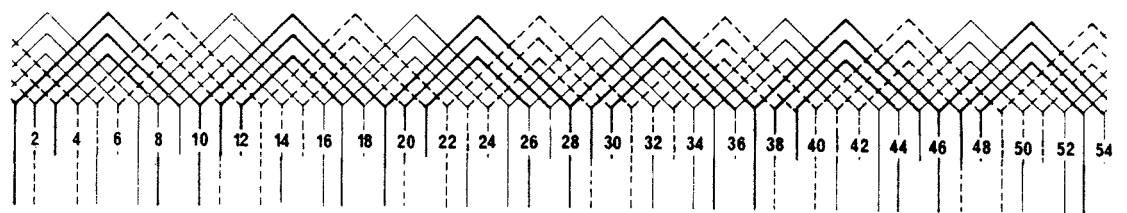


54 - 06 - 08/2  
(54-006-08/221-N)\*

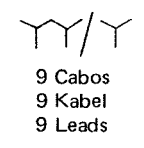
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



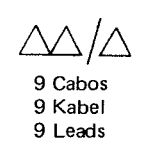
TRIFÁSICO	54 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:6:8:10
DREHSTROM	54 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	54 SLOTS	6 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:6:8:10



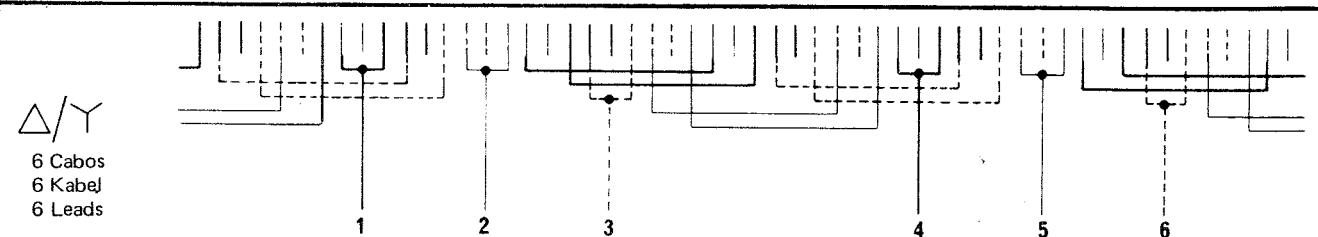
**A**



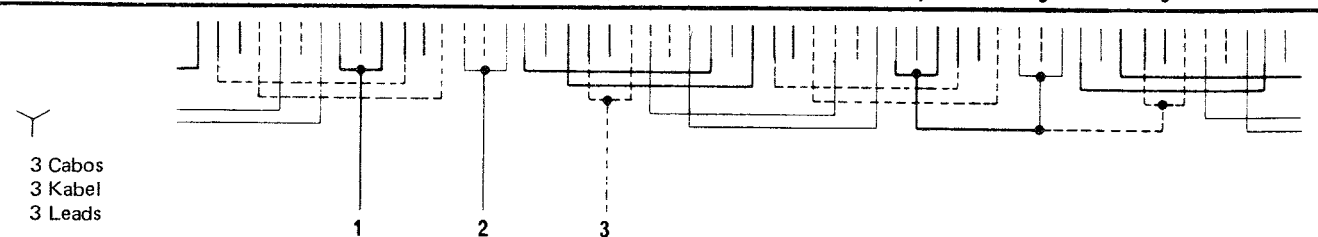
**B**



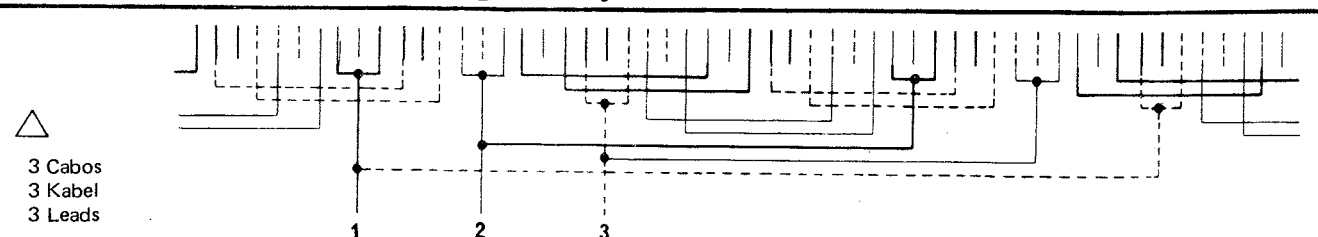
**C**



**D**



**E**



**F**

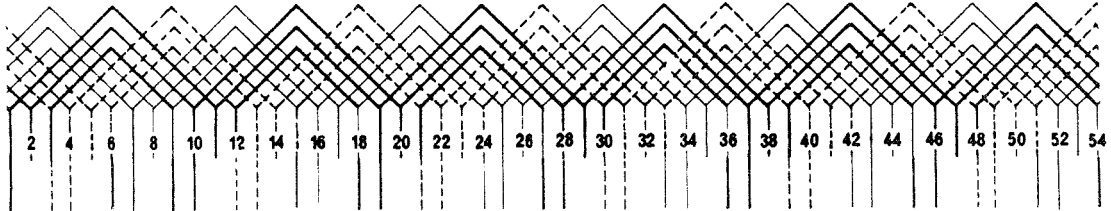
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

54 - 06 - 09/2  
(54-006-09/221-N)\*

TRIFÁSICO	54 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:7:9:11
DREHSTROM	54 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:7:9:11
THREE-PHASE	54 SLOTS	6 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:7:9:11



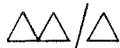
12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

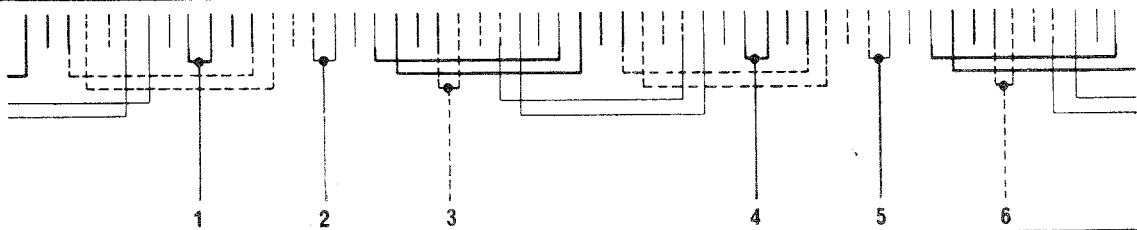


9 Cabos  
9 Kabel  
9 Leads

C



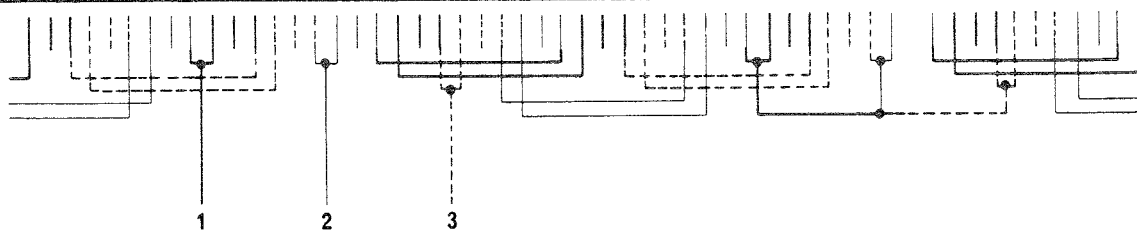
6 Cabos  
6 Kabel  
6 Leads



D



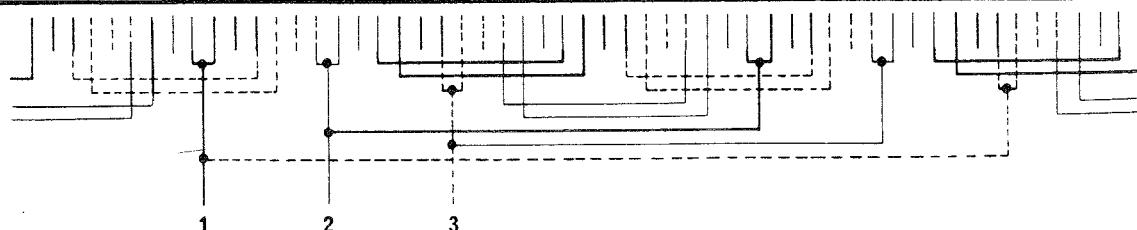
3 Cabos  
3 Kabel  
3 Leads



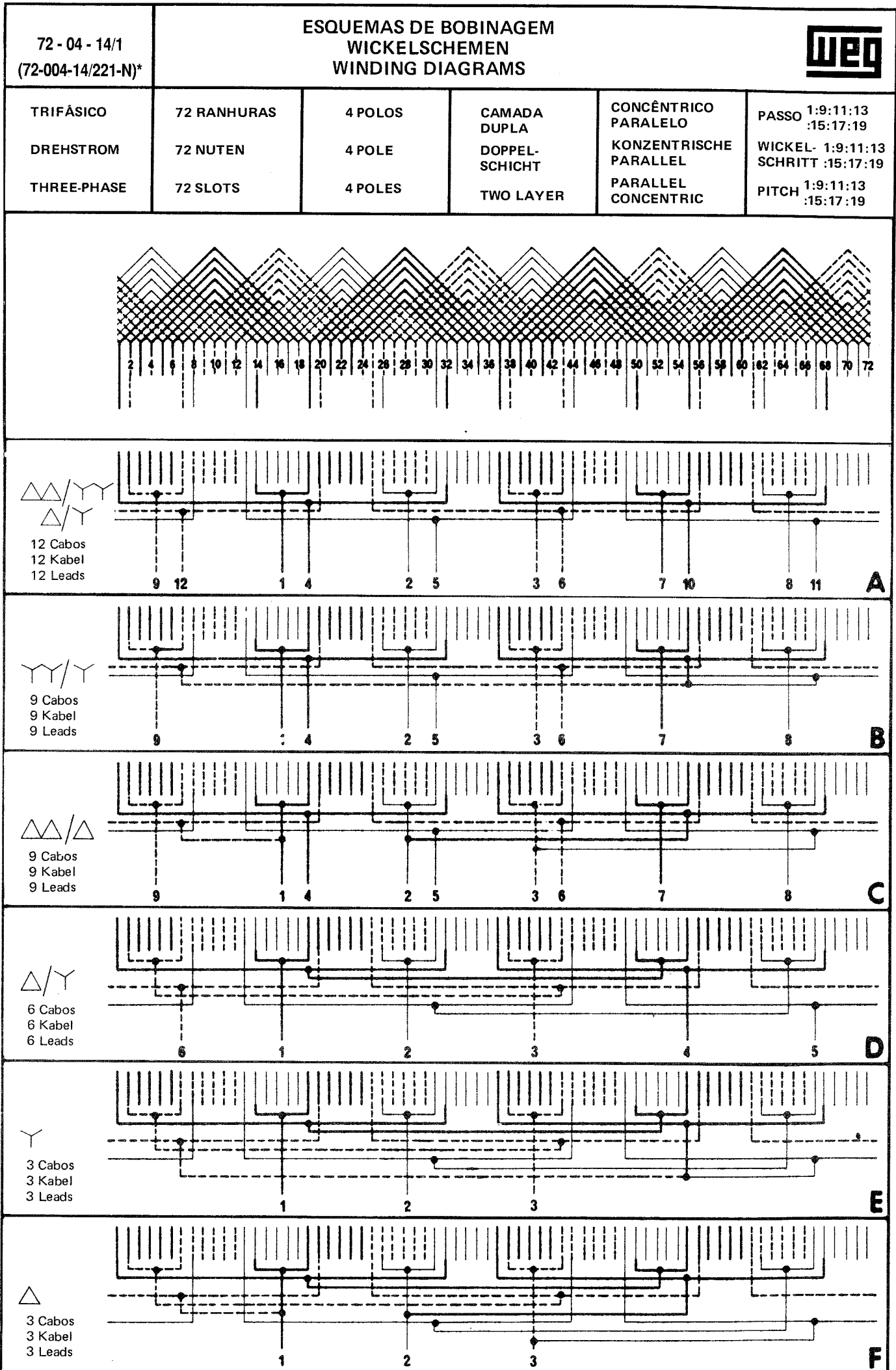
E



3 Cabos  
3 Kabel  
3 Leads



F



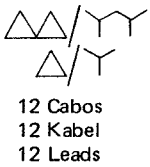
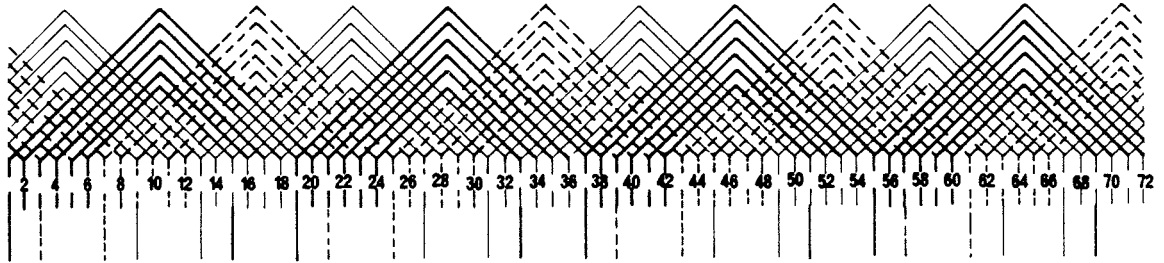
\*Nova nomenclatura



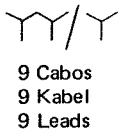
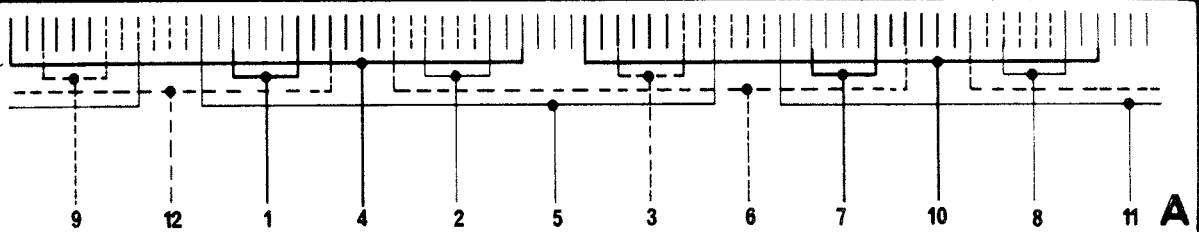
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 04 - 15/1  
(72-004-15/221-N)\*

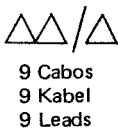
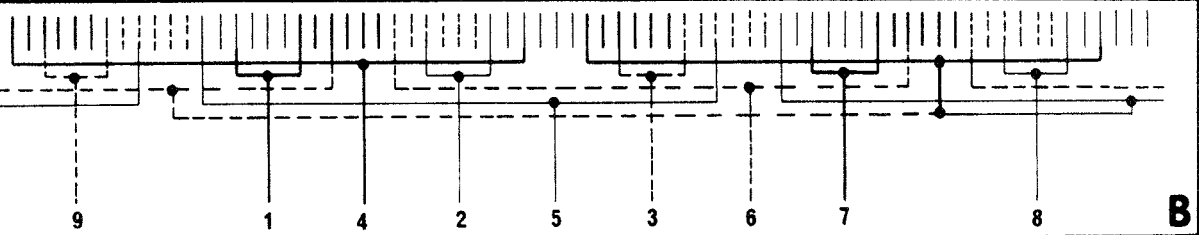
TRIFÁSICO	72 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:10:12:14 :16:18:20
DREHSTROM	72 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT :1:10:12:14 :16:18:20
THREE-PHASE	72 SLOTS	4 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:10:12:14 :16:18:20



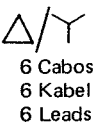
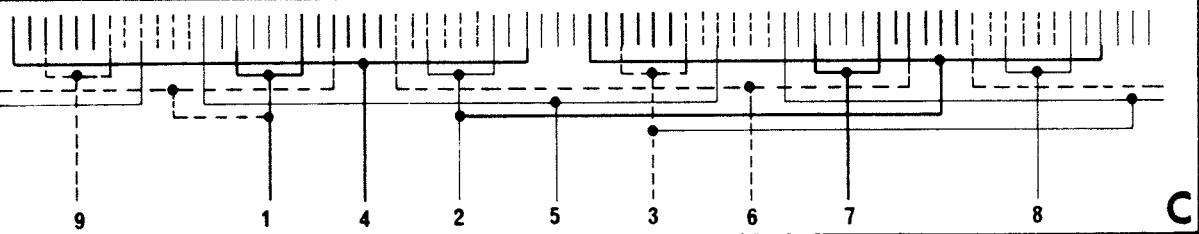
12 Cabos  
12 Kabel  
12 Leads



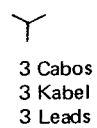
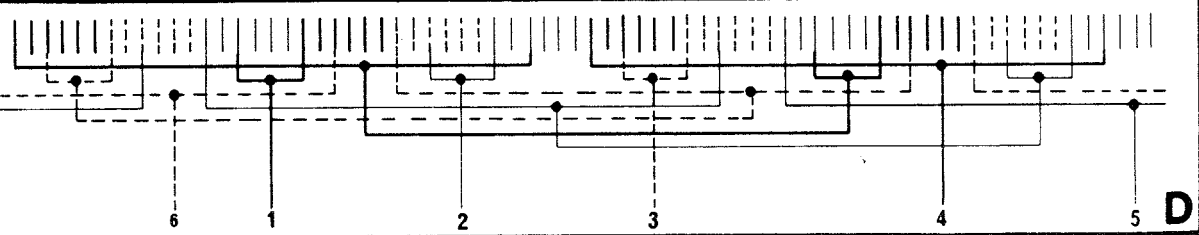
9 Cabos  
9 Kabel  
9 Leads



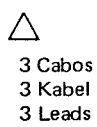
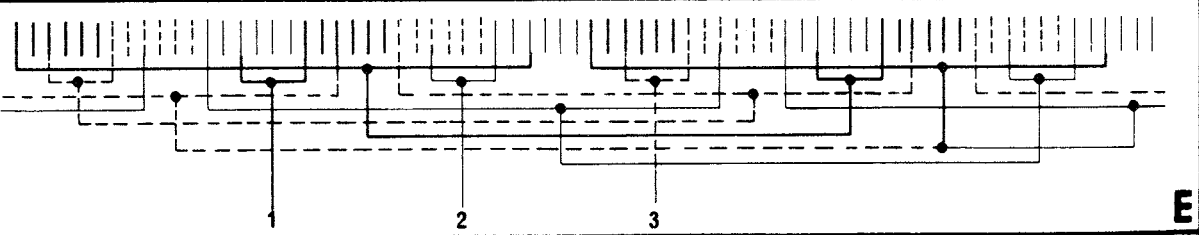
9 Cabos  
9 Kabel  
9 Leads



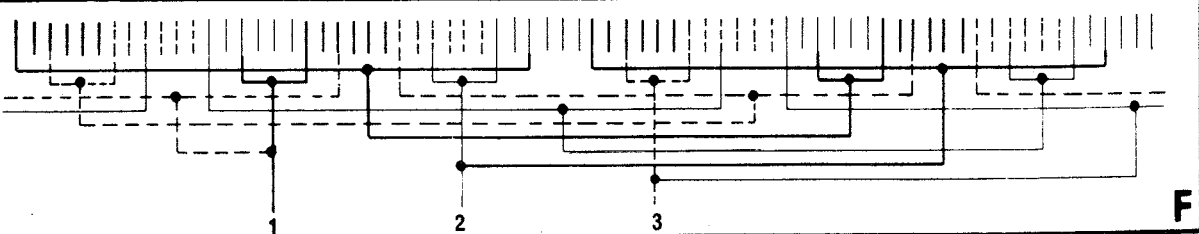
6 Cabos  
6 Kabel  
6 Leads



3 Cabos  
3 Kabel  
3 Leads



3 Cabos  
3 Kabel  
3 Leads



72 - 04 - 16/1  
(72-004-16/221-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

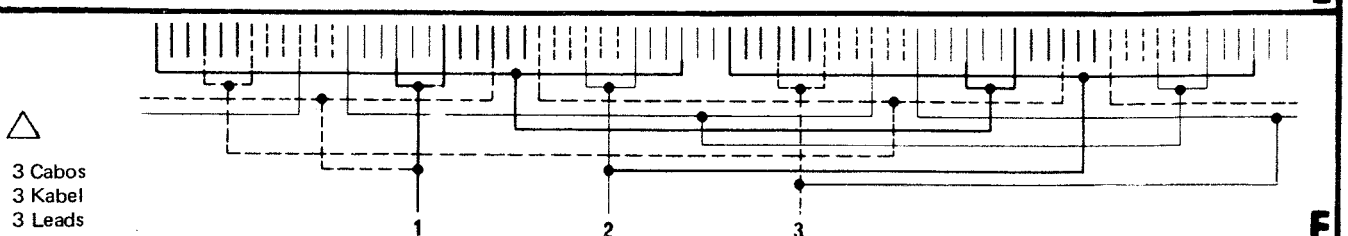
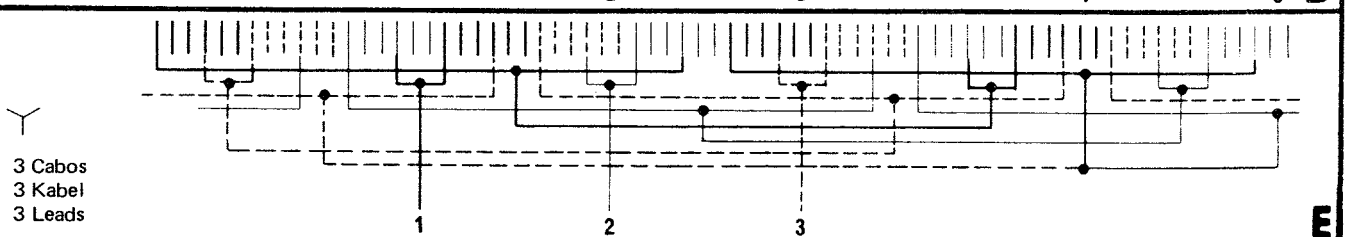
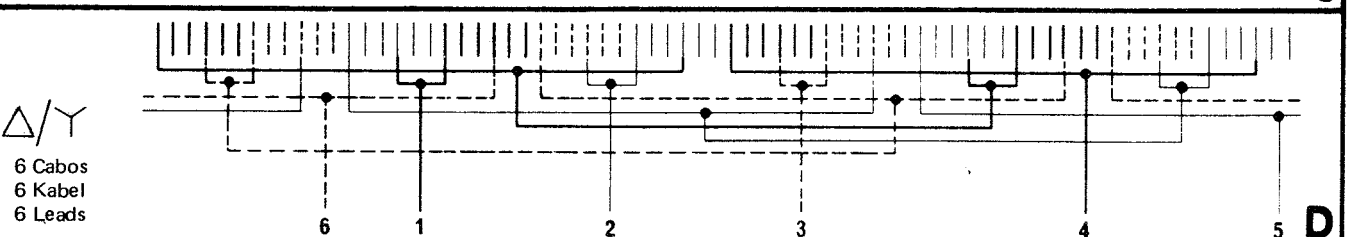
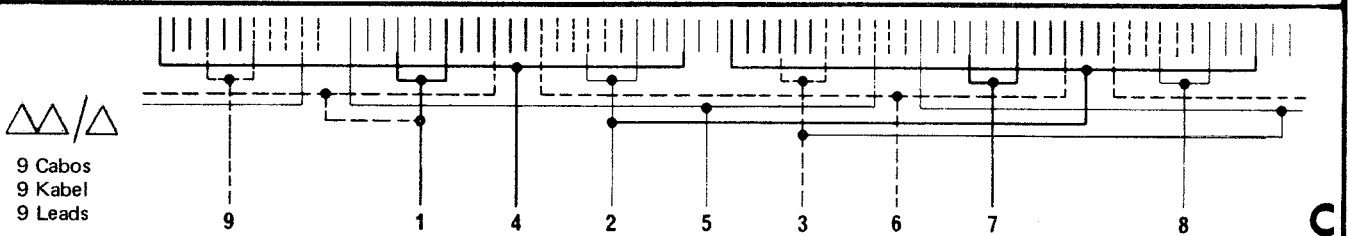
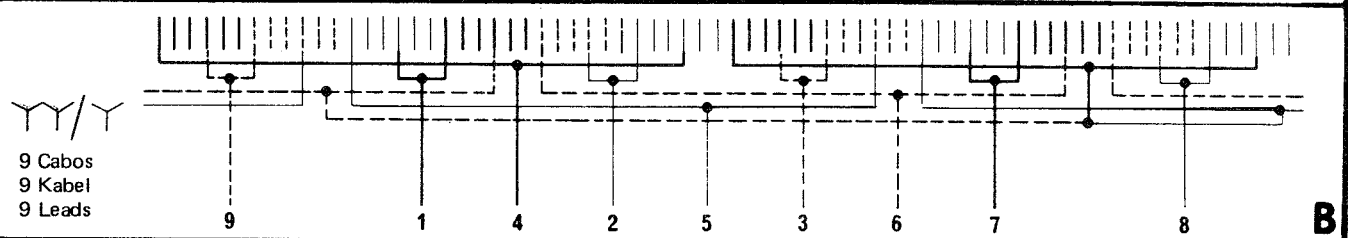
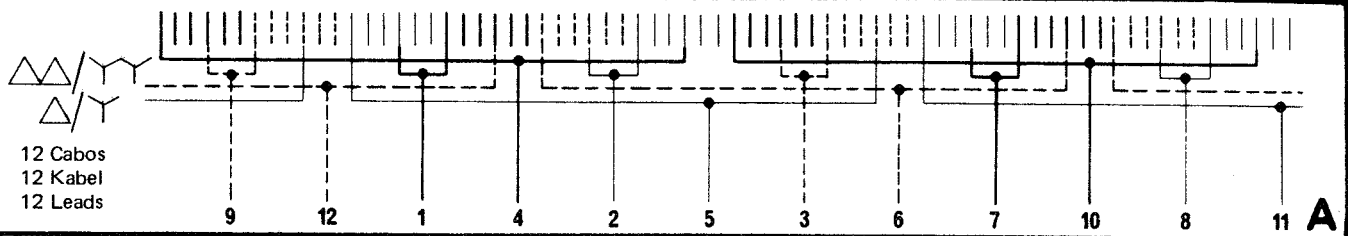
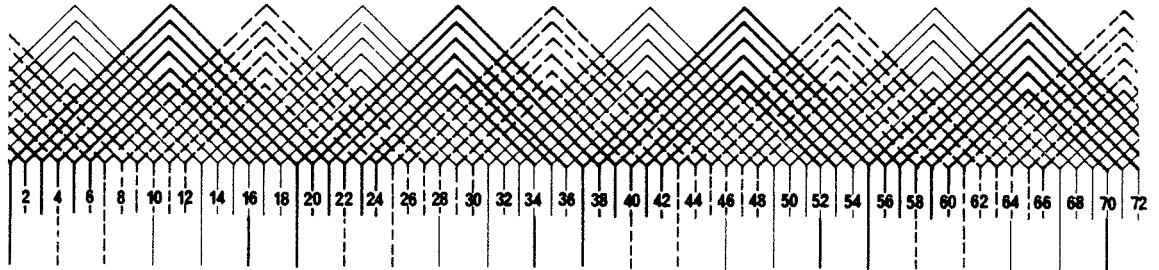
72 RANHURAS  
72 NUTEN  
72 SLOTS

4 POLOS  
4 POLE  
4 POLES

CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

CONCÊNTRICO PARALELO  
KONZENTRISCHE PARALLEL  
PARALLEL CONCENTRIC

PASSO 1:11:13:15  
:17:19:21  
WICKEL-SCHRITT 1:11:13:15  
:17:19:21  
PITCH 1:11:13:15  
:17:19:21



\*Nova nomenclatura

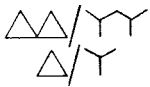
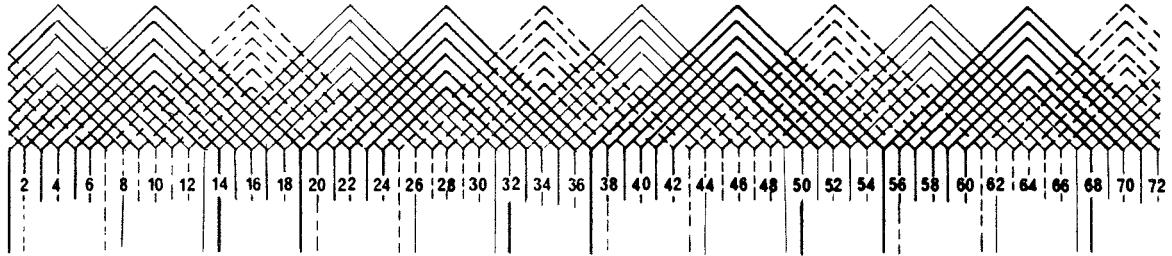




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

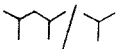
72 - 04 - 14/2  
(72-004-14/421-N)\*

TRIFÁSICO	72 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO 4 x PARALELO	PASSO 1:9:11:13 :15:17:19
DREHSTROM	72 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE 4 x PARALLEL	WICKEL-SCHRITT 1:9:11:13 :15:17:19
THREE-PHASE	72 SLOTS	4 POLES	TWO LAYER	CONCENTRIC 4 x PARALLEL	PITCH 1:9:11:13 :15:17:19



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

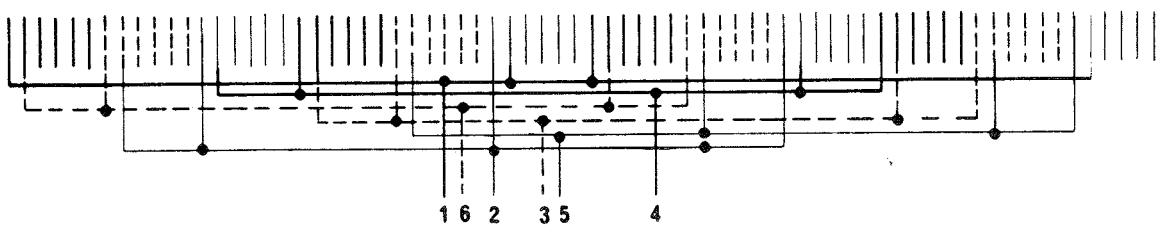


9 Cabos  
9 Kabel  
9 Leads

C



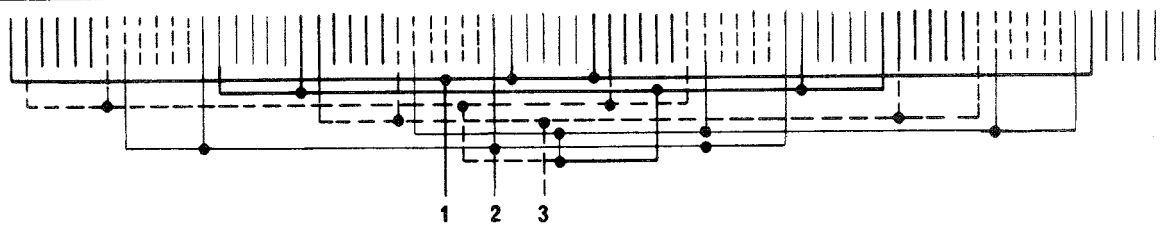
6 Cabos  
6 Kabel  
6 Leads



D



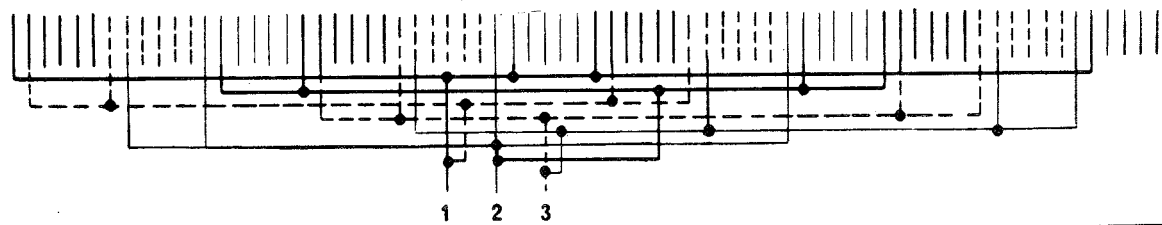
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

72 - 04 - 15/2  
(72-004-15/421-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

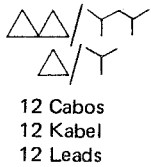
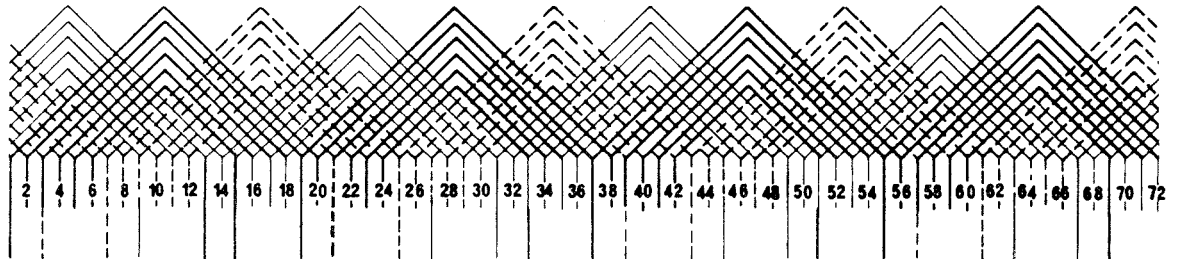
72 RANHURAS  
72 NUTEN  
72 SLOTS

4 POLOS  
4 POLE  
4 POLES

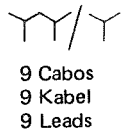
CAMADA  
DUPLA  
DOPPEL-  
SCHICHT  
TWO LAYER

CONCÊNTRICO  
4 x PARALELO  
KONZENTRISCHE  
4 x PARALLEL  
CONCENTRIC  
4 x PARALLEL

PASSO 1:10:12:14  
:16:18:20  
WICKEL- 1:10:12:14  
SCHRITT :16:18:20  
PITCH 1:10:12:14  
:16:18:20



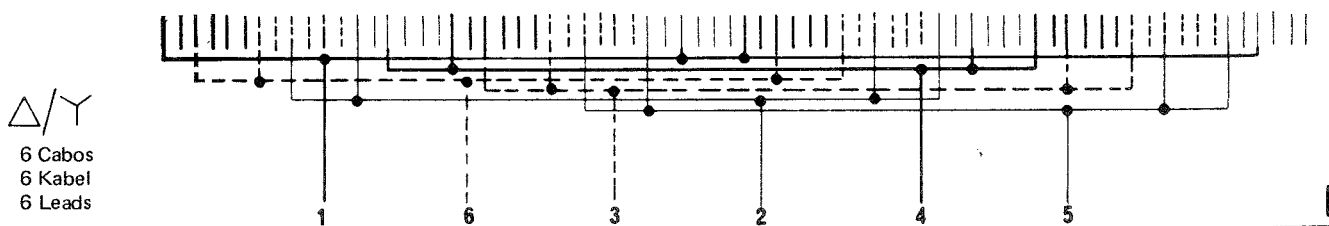
A



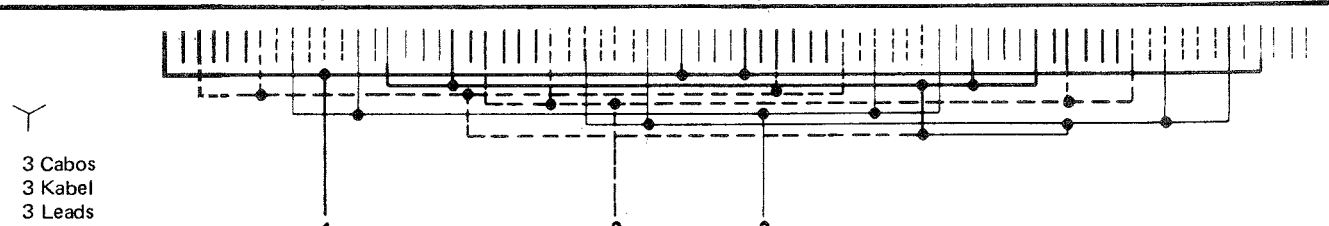
B



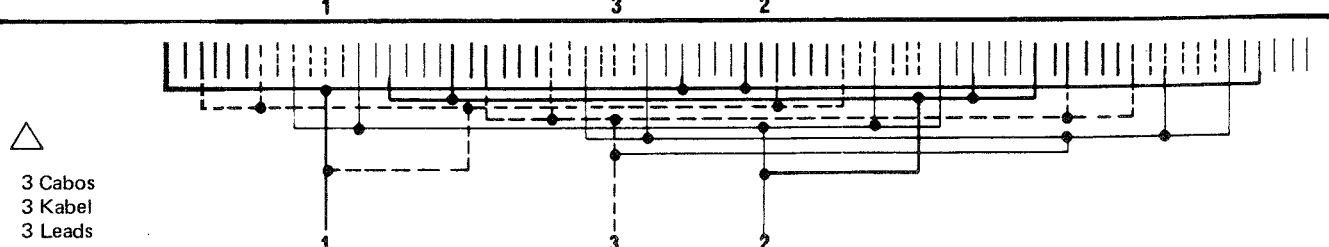
C



D



E



F

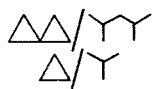
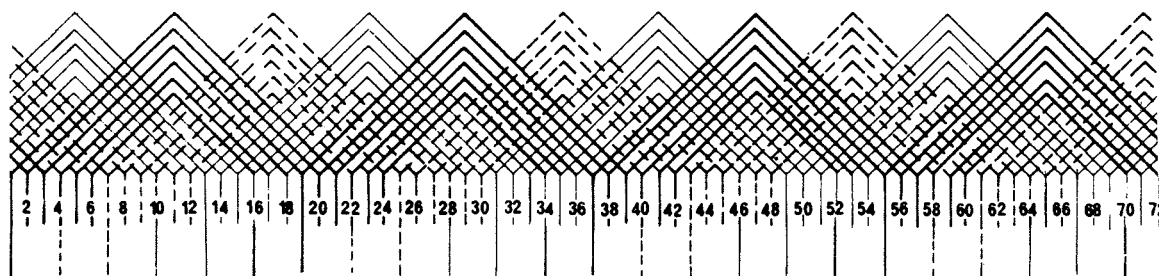
\*Nova nomenclatura



**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

72 - 04 - 16/2  
(72-004-16/421-N)\*

TRIFÁSICO	72 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO 4 x PARALELO	PASSO 1:11:13:15 :17:19:21
DREHSTROM	72 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE 4 x PARALLEL	WICKEL-SCHRITT :1:11:13:15 :17:19:21
THREE-PHASE	72 SLOTS	4 POLES	TWO LAYER	CONCENTRIC 4 x PARALLEL	PITCH 1:11:13:15 :17:19:21



12 Cabos  
12 Kabel  
12 Leads

**A**



9 Cabos  
9 Kabel  
9 Leads

**B**

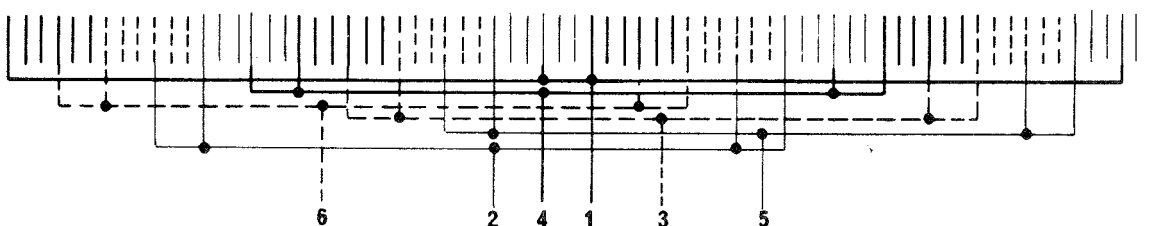


9 Cabos  
9 Kabel  
9 Leads

**C**



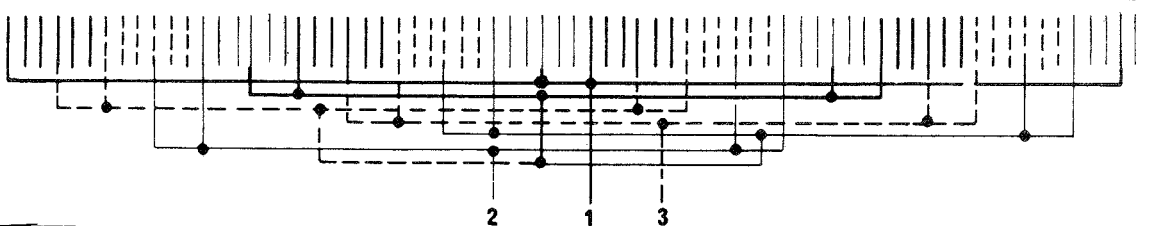
6 Cabos  
6 Kabel  
6 Leads



**D**



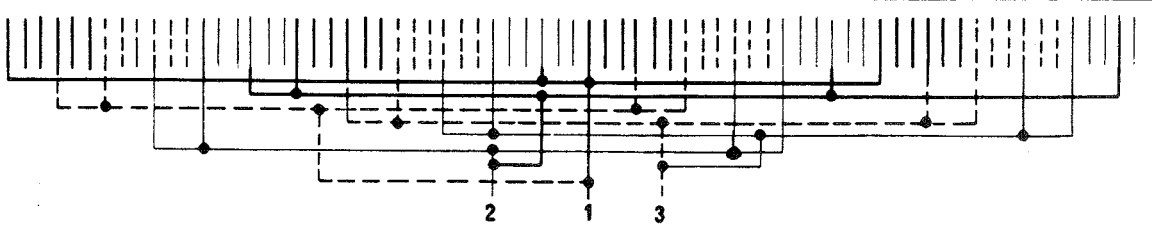
3 Cabos  
3 Kabel  
3 Leads



**E**



3 Cabos  
3 Kabel  
3 Leads



**F**

72 - 04 - 16/3  
(72-004-16/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

72 RANHURAS

4 POLOS

CAMADA DUPLA

CONCÊNTRICO SERIE

PASSO 1:11:13:15  
:17:19:21

DREHSTROM

72 NUTEN

4 POLE

DOPPEL-SCHICHT

KONZENTRISCHE SERIE

WICKEL-SCHRITT 1:11:13:15  
:17:19:21

THREE-PHASE

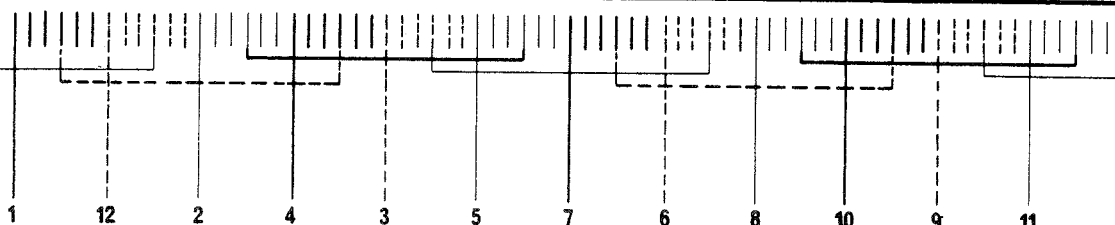
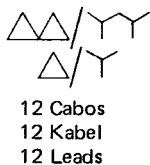
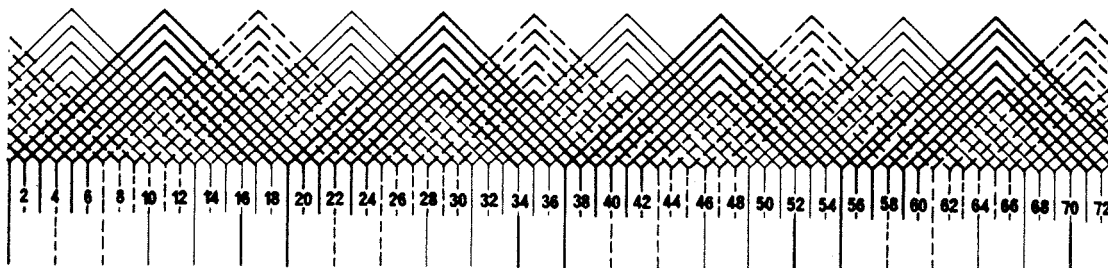
72 SLOTS

4 POLES

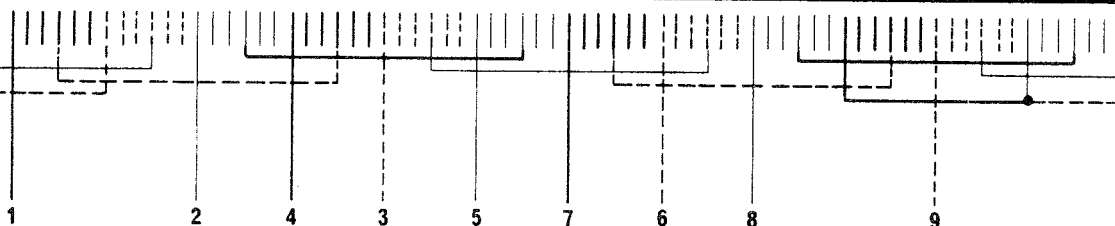
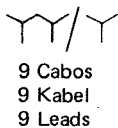
TWO LAYER

SERIES CONCENTRIC

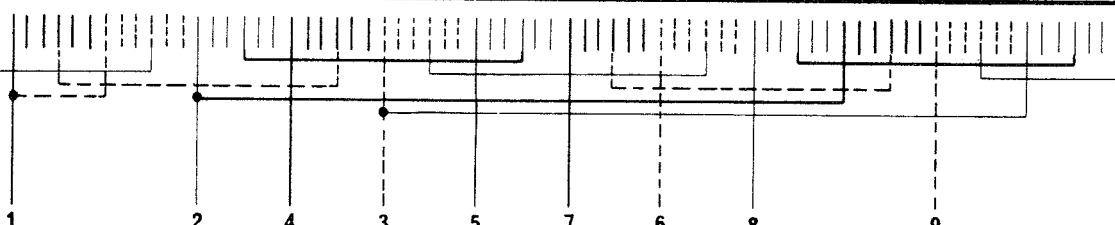
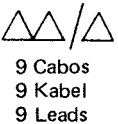
PITCH 1:11:13:15  
:17:19:21



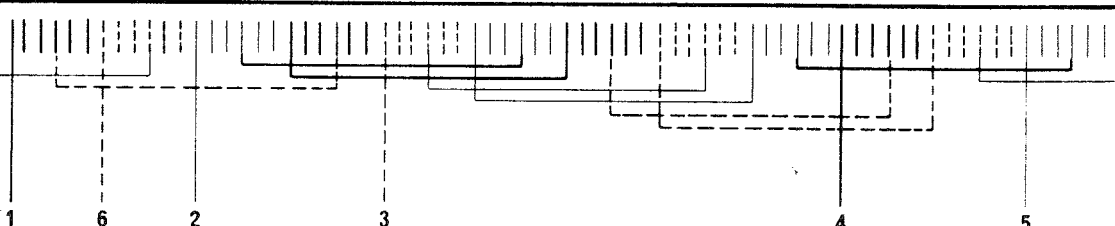
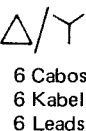
A



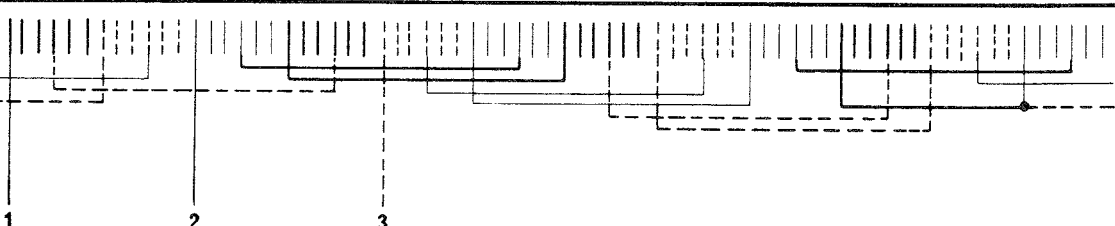
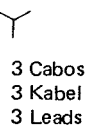
B



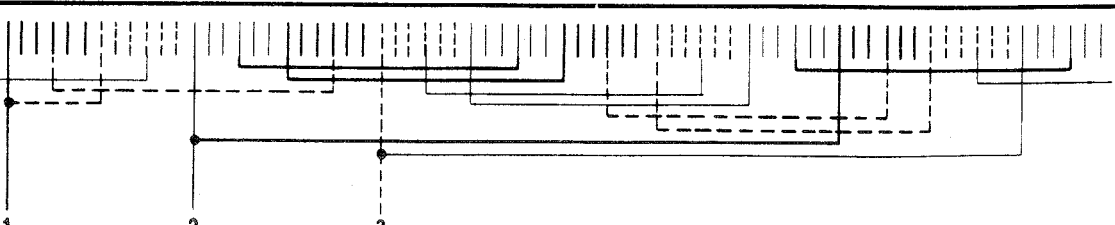
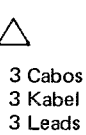
C



D



E



F

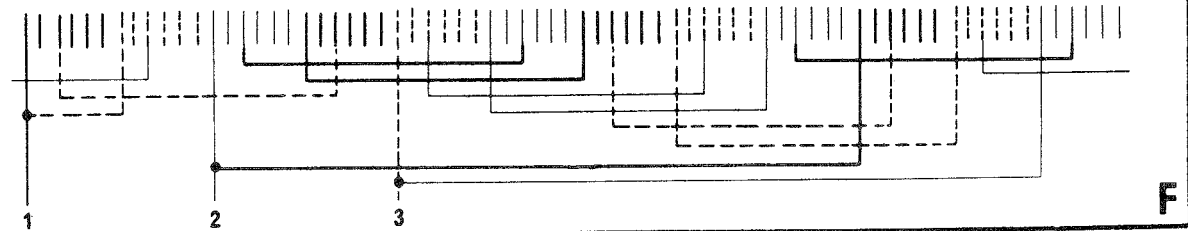
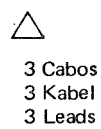
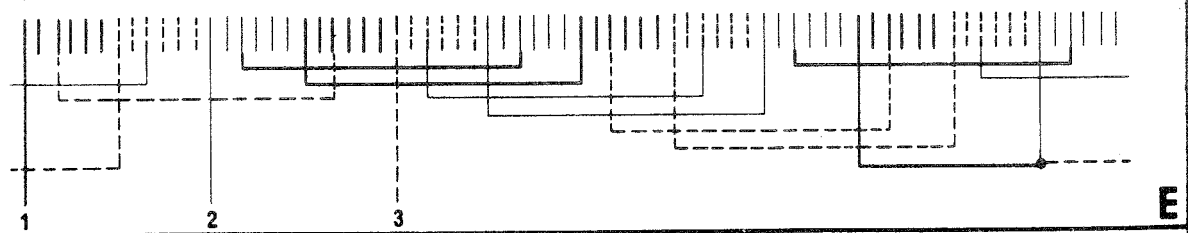
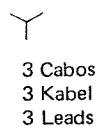
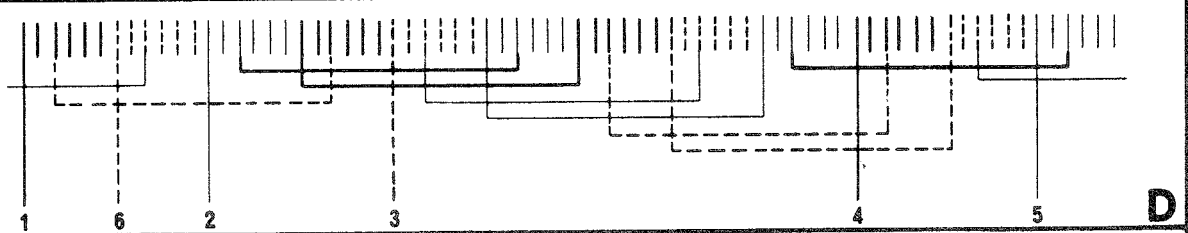
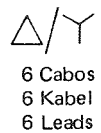
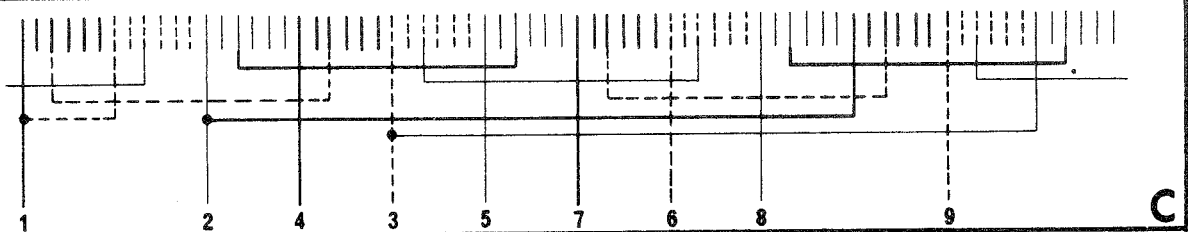
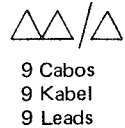
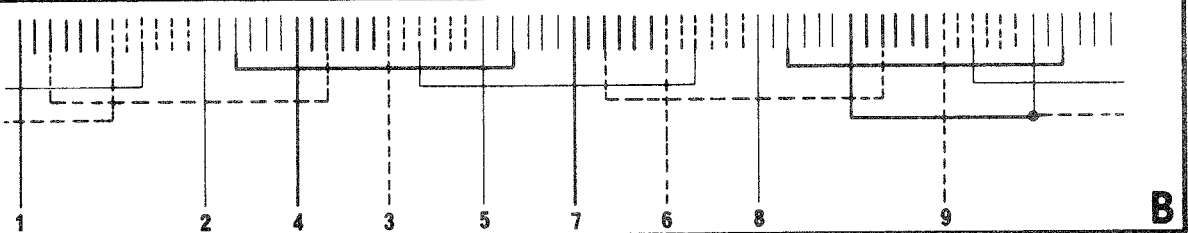
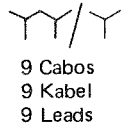
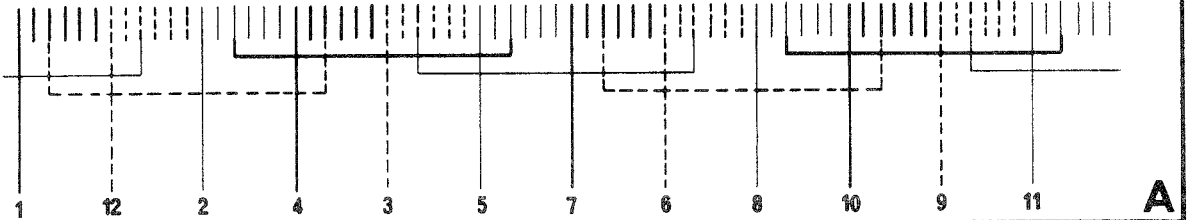
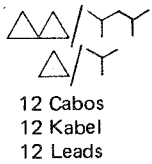
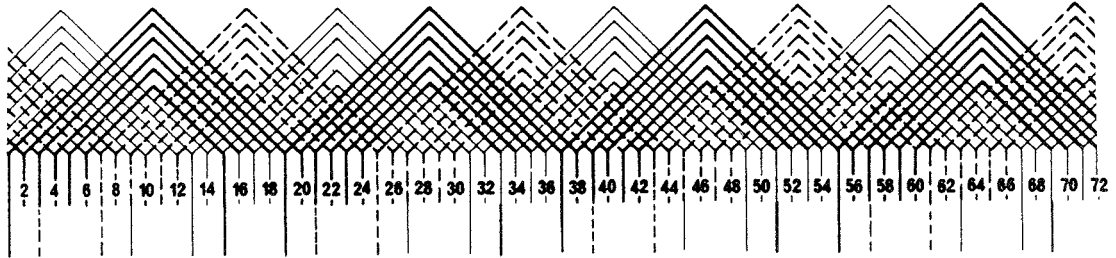
\*Nova nomenclatura

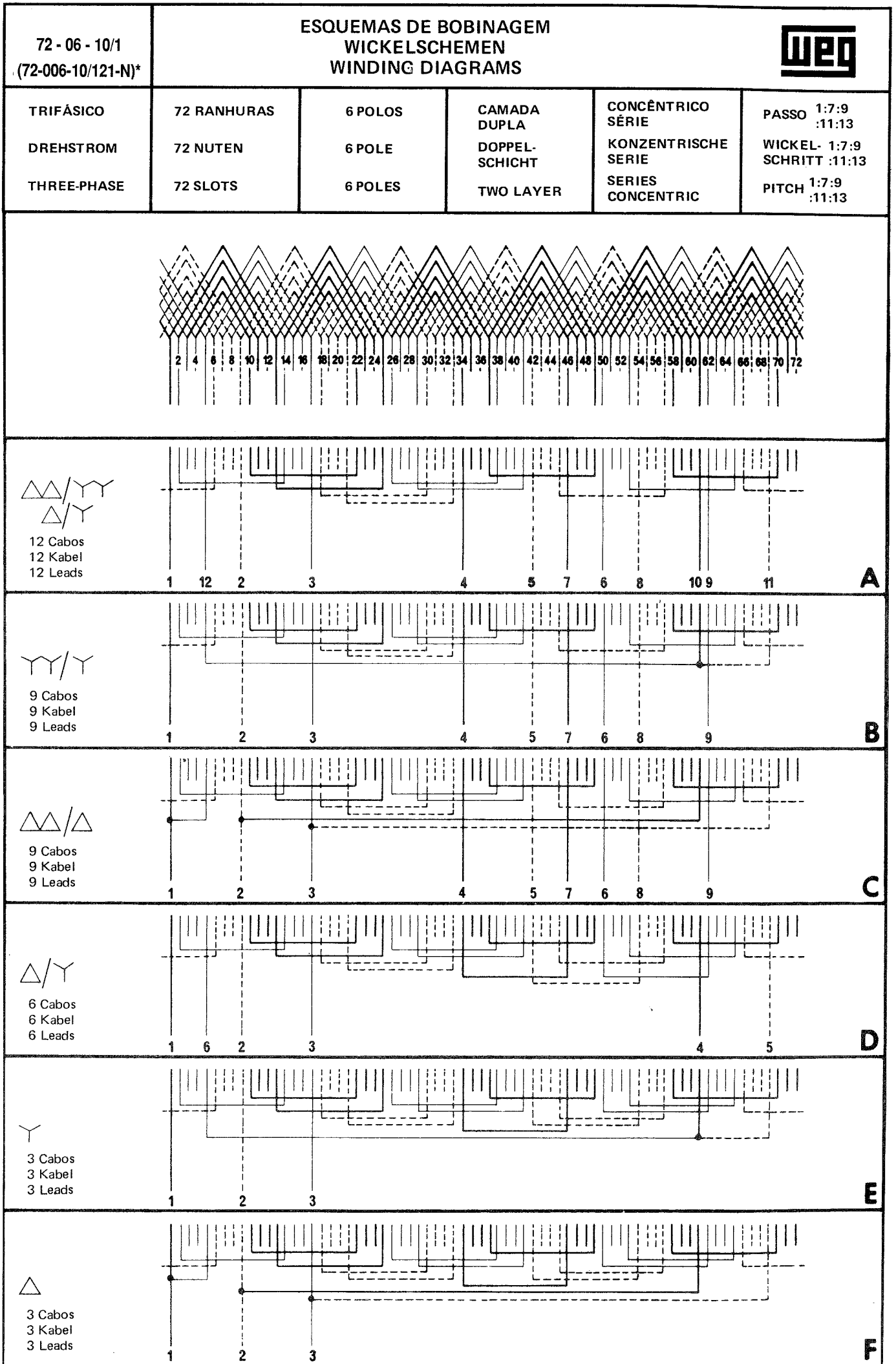


ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 04 - 15/3  
(72-004-15/121-N)\*

TRIFÁSICO	72 RANHURAS	4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:10:12:14 :16:18:20
DREHSTROM	72 NUTEN	4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:10:12:14 :16:18:20
THREE-PHASE	72 SLOTS	4 POLES	TWO LAYER	SÉRIE CONCENTRIC	PITCH 1:10:12:14 :16:18:20





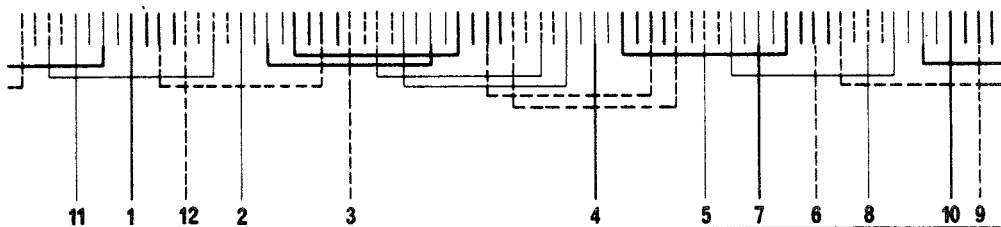
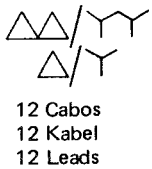
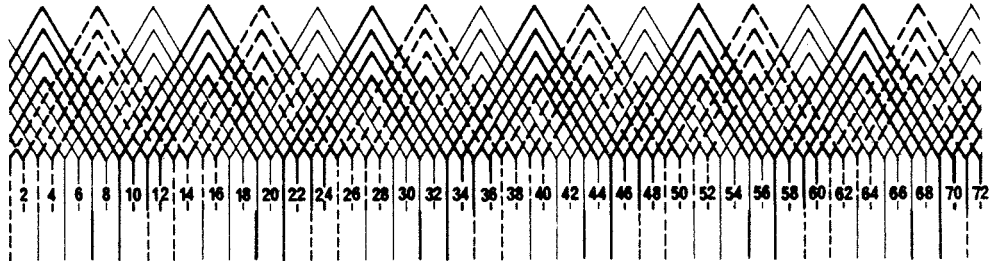
\*Nova nomenclatura



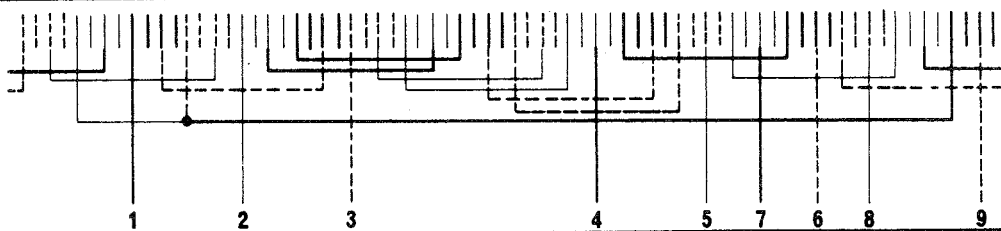
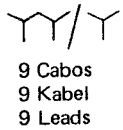
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 11/1  
(72-006-11/121-N)\*

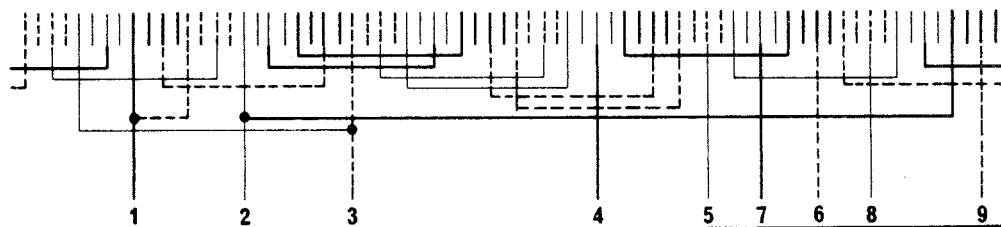
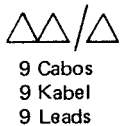
TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:8:10 :12:14
DREHSTROM	72 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SERIE	WICKEL- 1:8:10 SCHRITT :12:14
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:8:10 :12:14



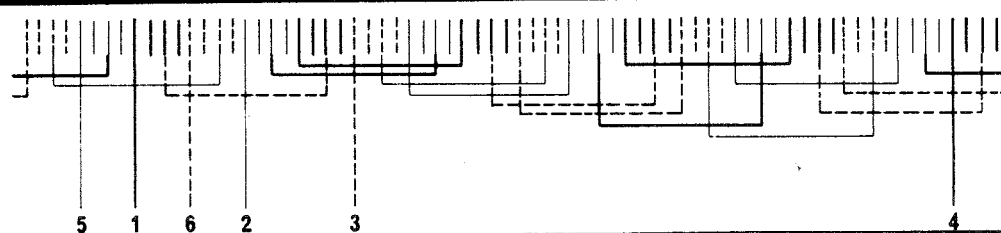
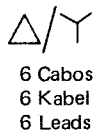
**A**



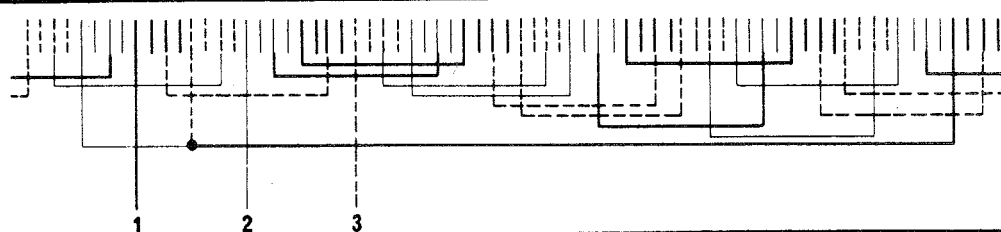
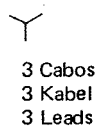
**B**



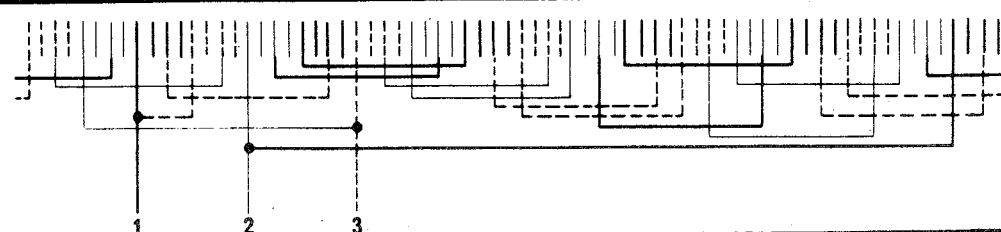
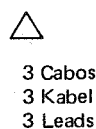
**C**



**D**



**E**



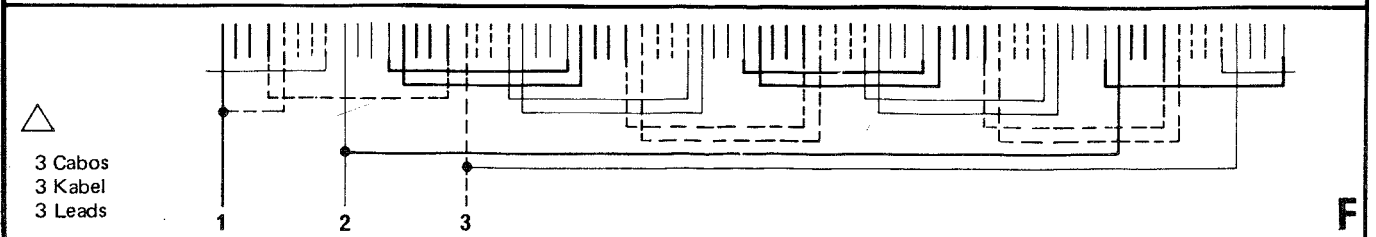
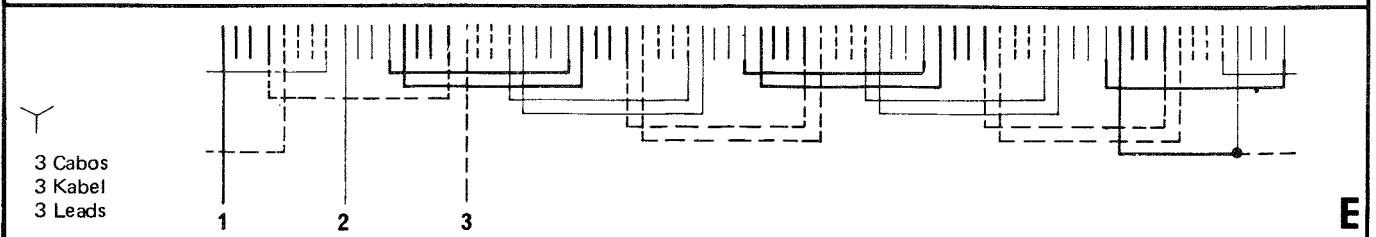
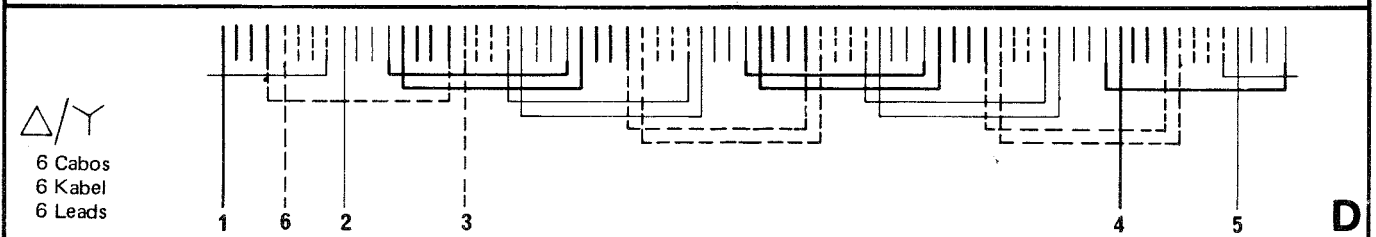
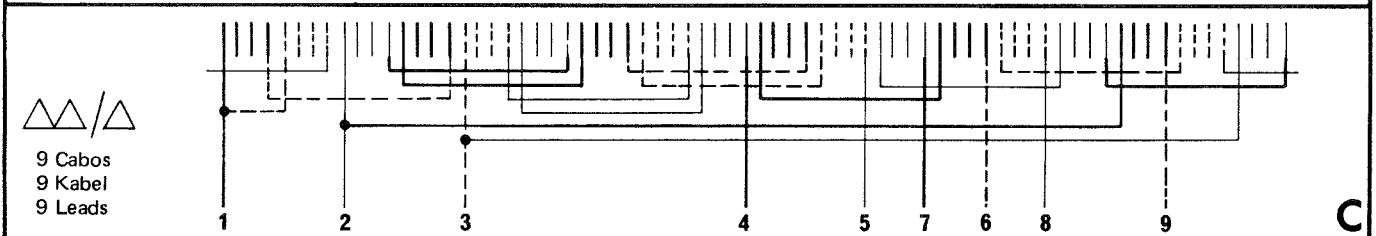
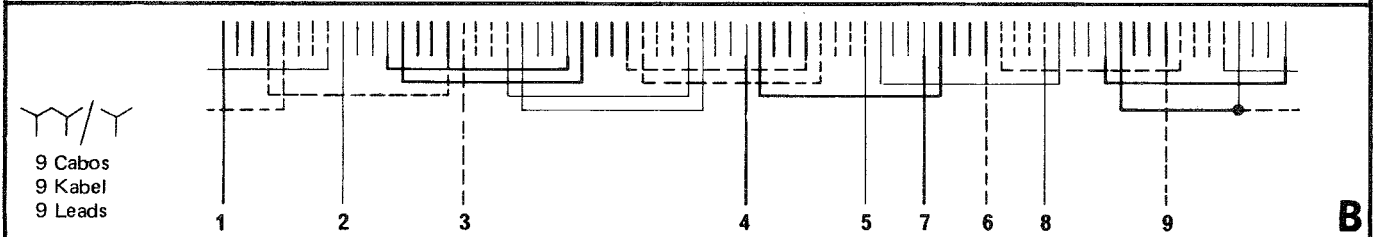
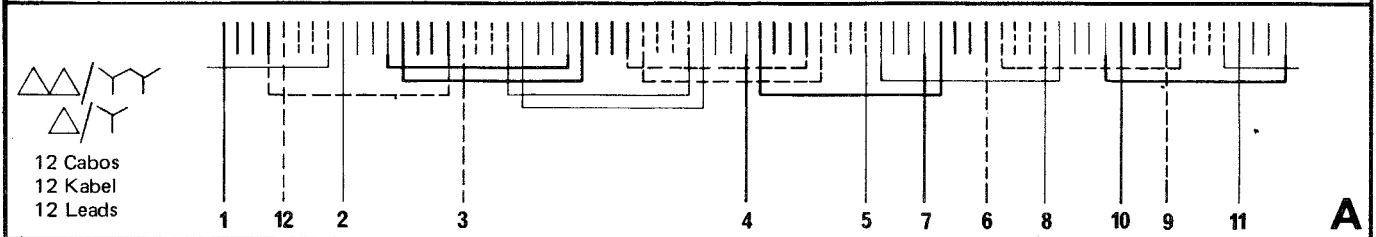
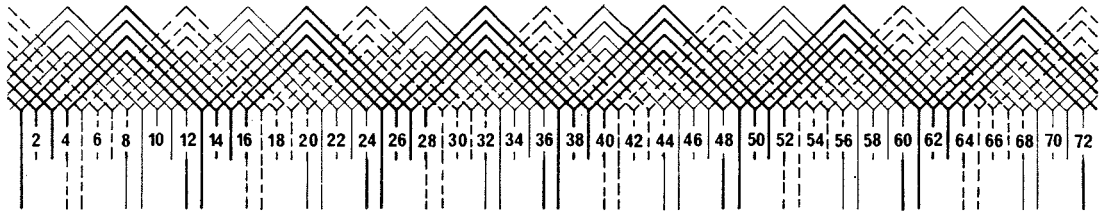
**F**

72 - 06 - 12/1  
(72-006-12/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:9:11 :13:15
DREHSTROM	72 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT :1:9:11 :13:15
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	SÉRIES CONCENTRIC	PITCH 1:9:11 :13:15



\*Nova nomenclatura

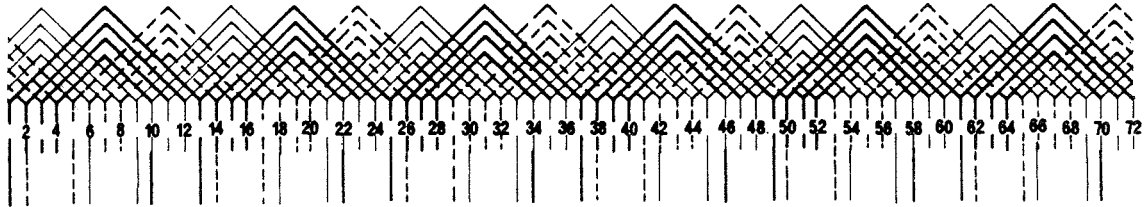




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 10/2  
(72-006-10/221-N)\*

TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:7:9 :11:13
DREHSTROM	72 NUTEN	6 POLE	DÖPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT :1:7:9 :11:13
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:7:9 :11:13



12 Cabos  
12 Kabel  
12 Leads

**A**



9 Cabos  
9 Kabel  
9 Leads

**B**

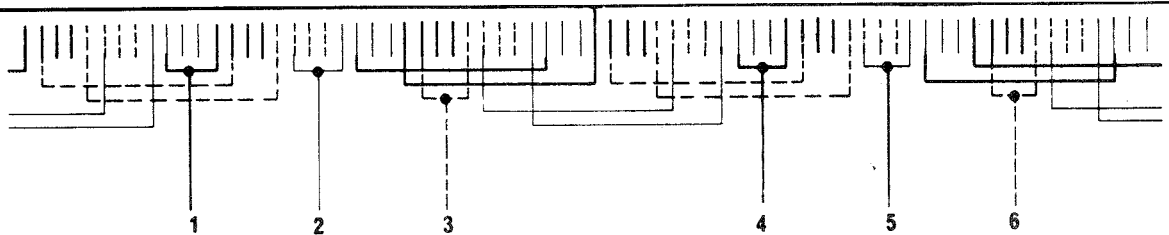


9 Cabos  
9 Kabel  
9 Leads

**C**



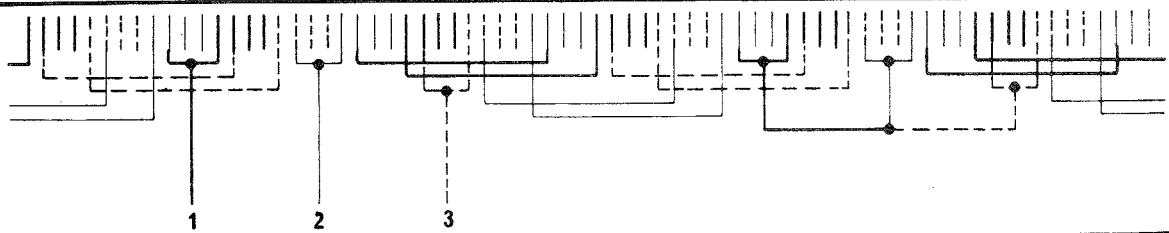
6 Cabos  
6 Kabel  
6 Leads



**D**



3 Cabos  
3 Kabel  
3 Leads




**E**

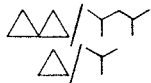
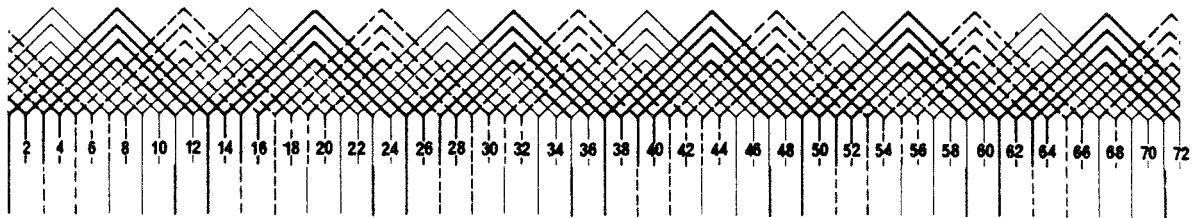


3 Cabos  
3 Kabel  
3 Leads



**F**

<p>72 - 06 - 11/2 (72-006-11/221-N)*</p>	<p><b>ESQUEMAS DE BOBINAGEM</b> <b>WICKELSCHEMEN</b> <b>WINDING DIAGRAMS</b></p>				
<p>TRIFÁSICO DREHSTROM THREE-PHASE</p>	<p>72 RANHURAS 72 NUTEN 72 SLOTS</p>	<p>6 POLOS 6 POLE 6 POLES</p>	<p>CAMADA DUPLA DOPPEL-SCHICHT TWO LAYER</p>	<p>CONCÊNTRICO PARALELO KONZENTRISCHE PARALLEL PARALLEL CONCENTRIC</p>	<p>PASSO 1:8:10 :12:14 WICKEL- 1:8:10 SCHRITT :12:14 PITCH 1:8:10 :12:14</p>



12 Cabos  
12 Kabel  
12 Leads

**A**



9 Cabos  
9 Kabel  
9 Leads

**B**

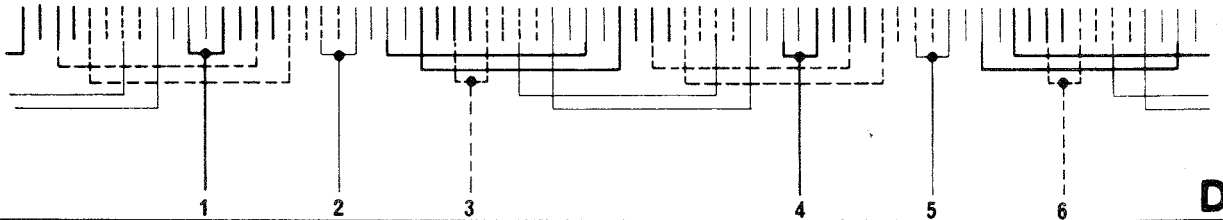


9 Cabos  
9 Kabel  
9 Leads

**C**



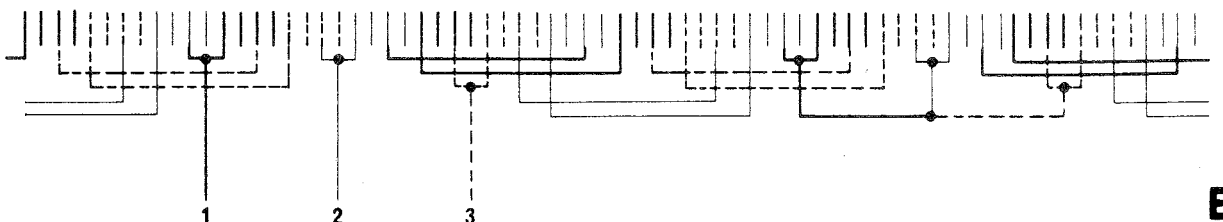
6 Cabos  
6 Kabel  
6 Leads



**D**



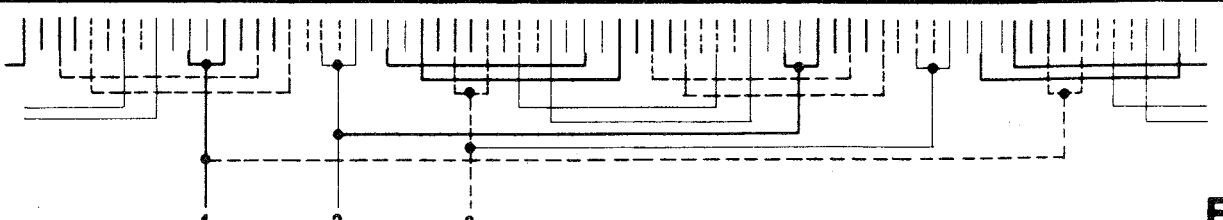
3 Cabos  
3 Kabel  
3 Leads



**E**



3 Cabos  
3 Kabel  
3 Leads



**F**

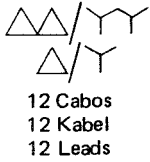
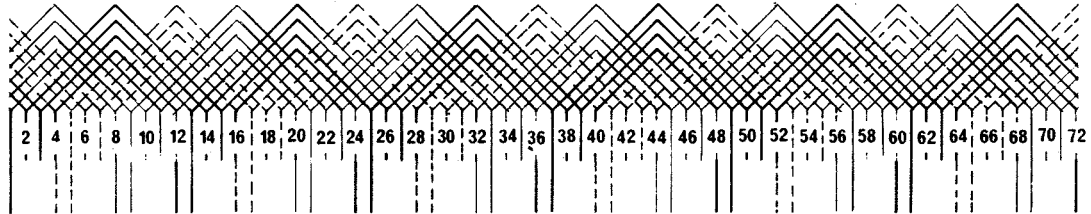
\*Nova nomenclatura



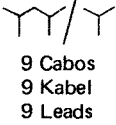
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 12/2  
(72-006-12/221-N)\*

TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:9:11 :13:15
DREHSTROM	72 NUTEN	6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:9:11 :13:15
THREE-PHASE	72 SLOTS	6 POLE	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:9:11 :13:15



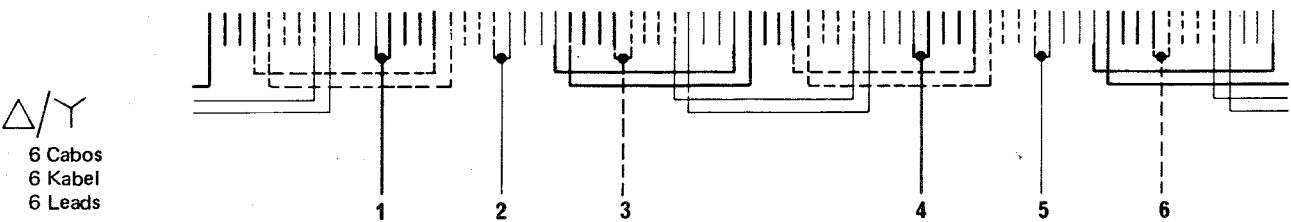
A



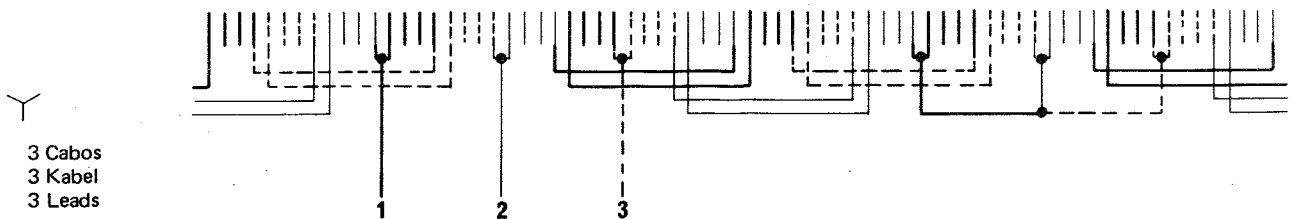
B



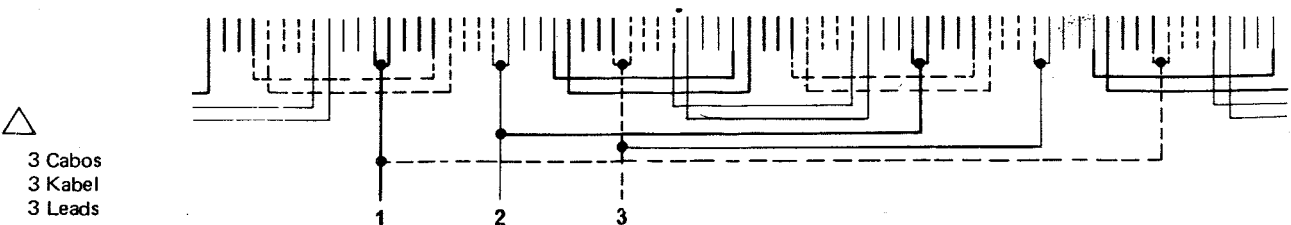
C



D



E



F

72 - 06 - 10/3  
(72-006-10/321-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

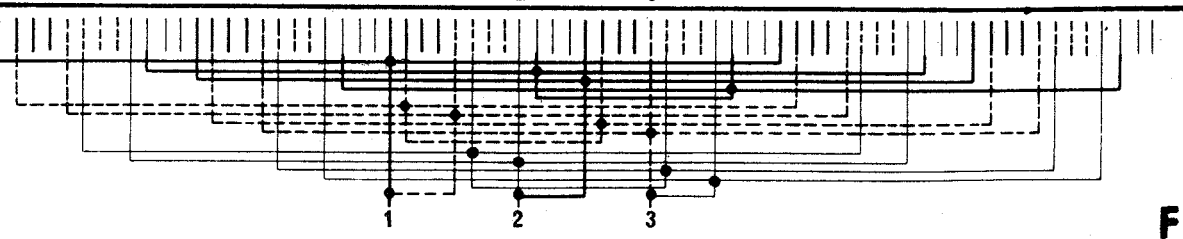
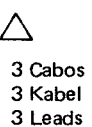
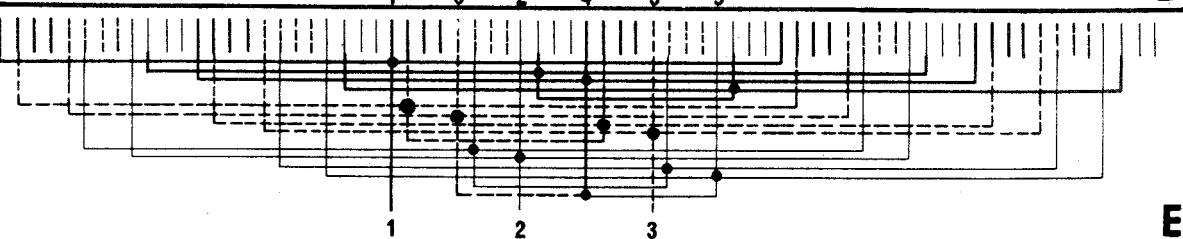
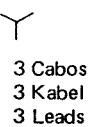
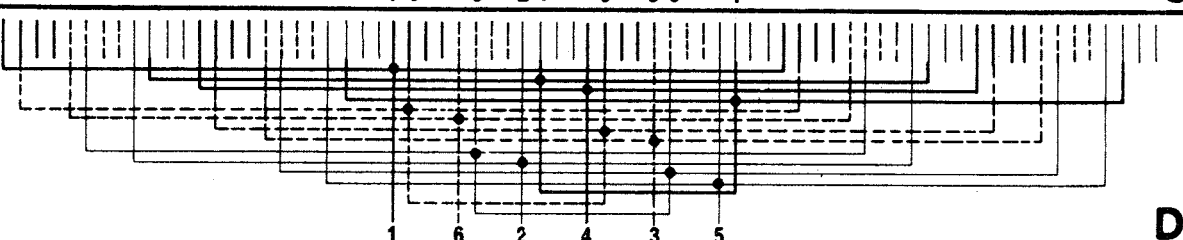
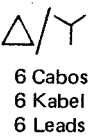
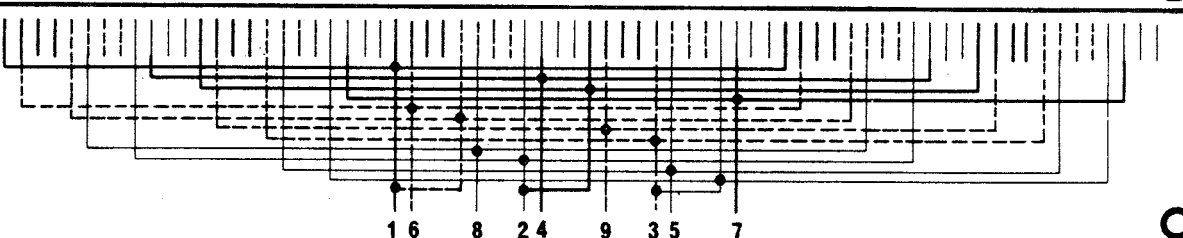
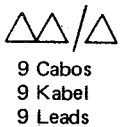
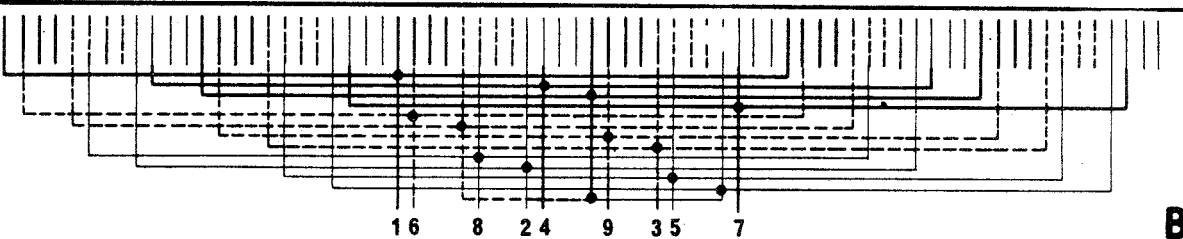
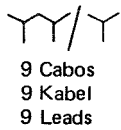
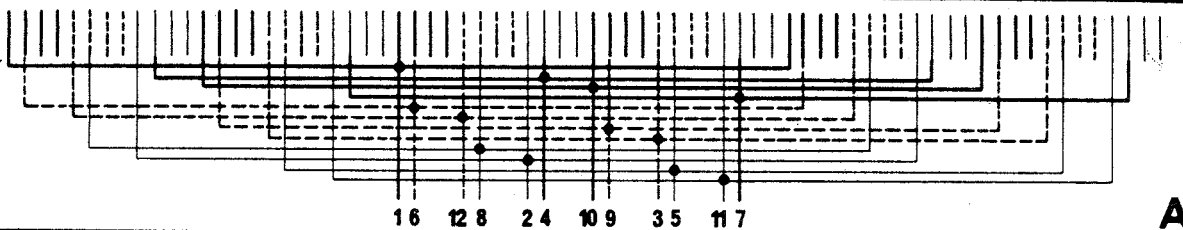
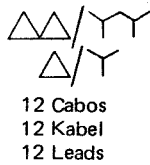
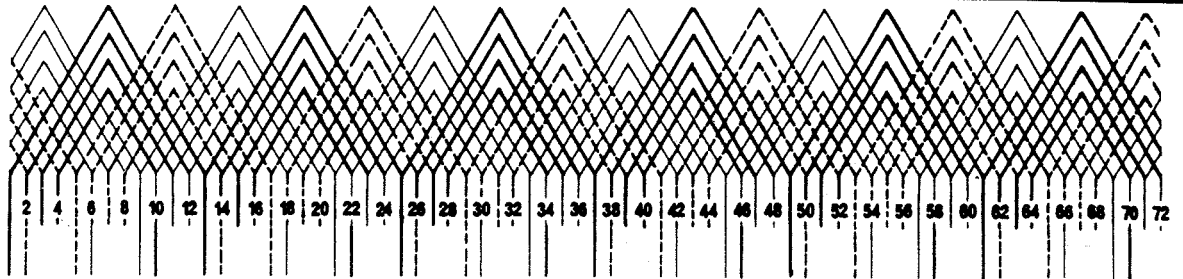
72 RANHURAS  
72 NUTEN  
72 SLOTS

6 POLOS  
6 POLE  
6 POLES

CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

CONCÊNTRICO  
3 x PARALELO  
KONZENTRISCHE  
CONCENTRIC  
3 x PARALLEL

PASSO 1:7:9  
:11:13  
WICKEL- 1:7:9  
SCHRITT :11:13  
PITCH 1:7:9  
:11:13



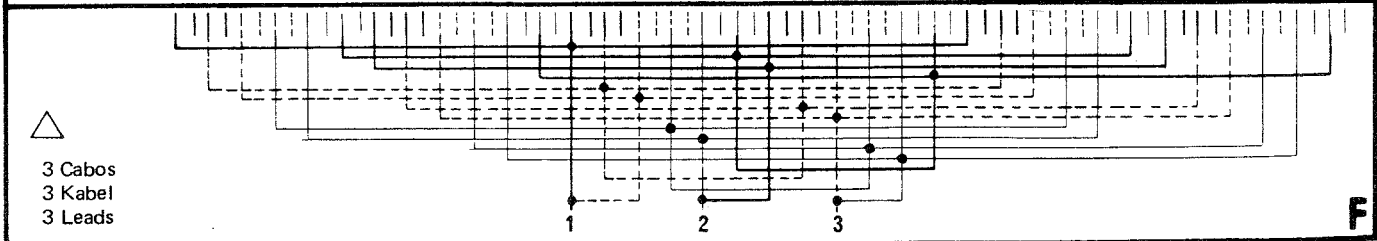
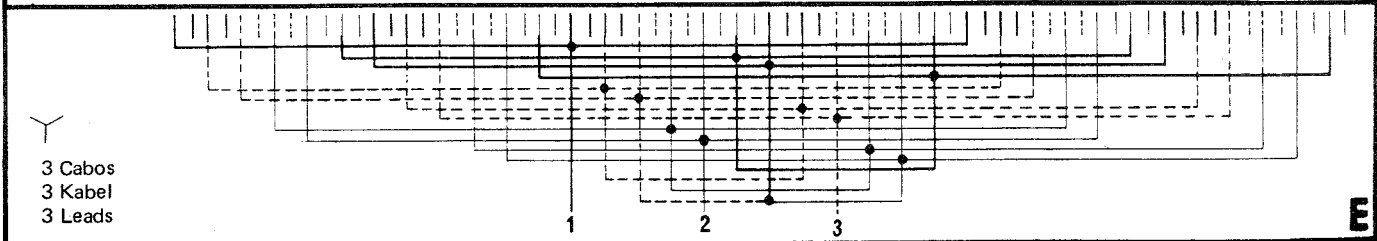
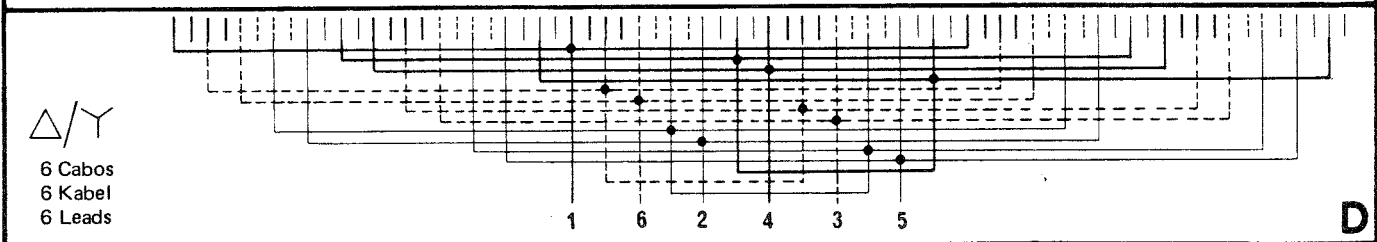
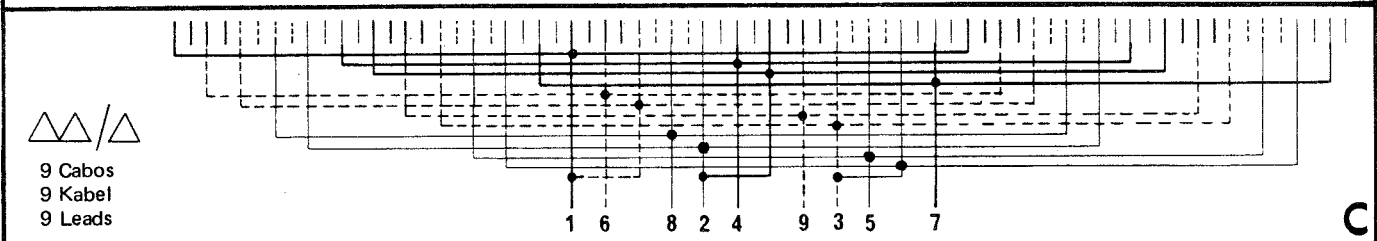
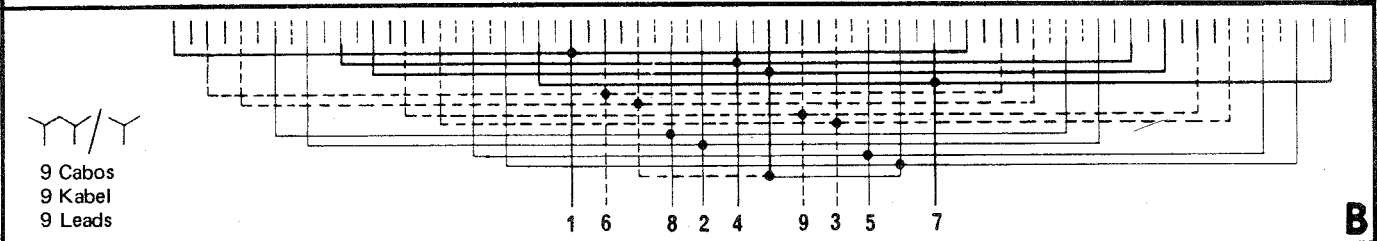
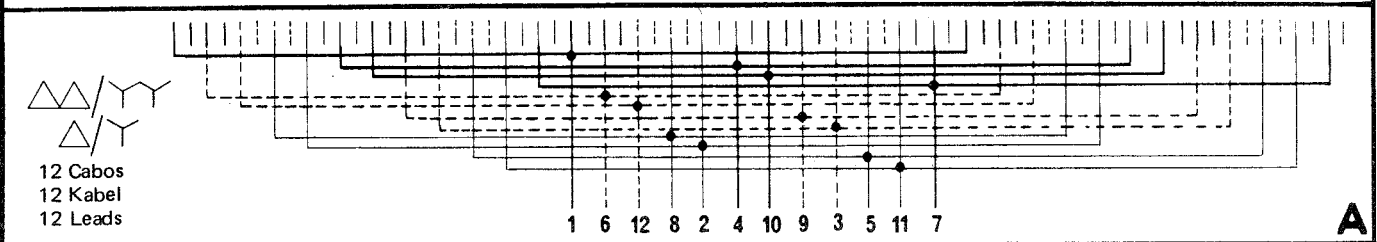
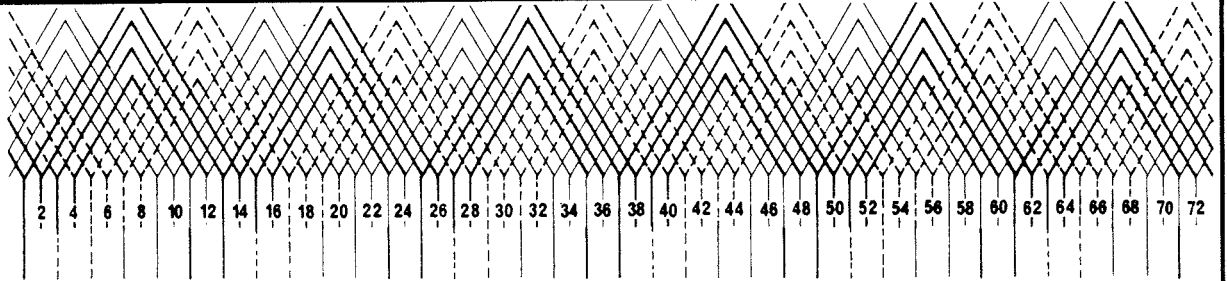
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 11/3  
(72-006-11/321-N)\*

TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO 3 x PARALELO	PASSO 1:8:10 :12:14
DREHSTROM	72 NUTEN	6 POLE	DOPPEL- SCHICHT	KONZENTRISCHE 3 x PARALLEL	WICKEL- 1:8:10 SCHRITT :12:14
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	CONCENTRIC 3 x PARALLEL	PITCH 1:8:10 :12:14



72 - 06 - 10/4  
(72-006-10/621-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

72 RANHURAS

6 POLOS

CAMADA  
DUPLA

CONCÊNTRICO  
6 x PARALELO

PASSO 1:7:9  
:11:13

DREHSTROM

72 NUTEN

6 POLE

DOPPEL-  
SCHICHT

KONZENTRISCHE  
6 x PARALLEL

WICKEL- 1:7:9  
SCHRITT :11:13

THREE-PHASE

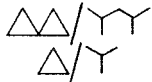
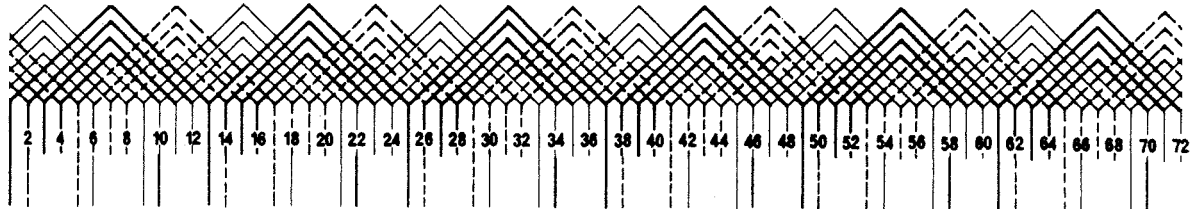
72 SLOTS

6 POLES

TWO LAYER

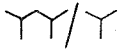
CONCENTRIC  
6 x PARALLEL

PITCH 1:7:9  
:11:13



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

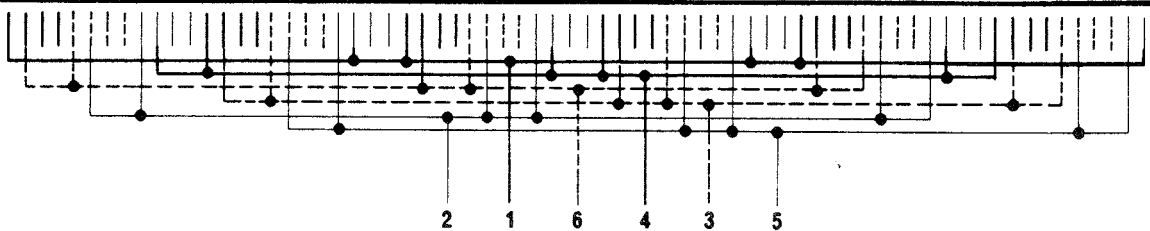


9 Cabos  
9 Kabel  
9 Leads

C



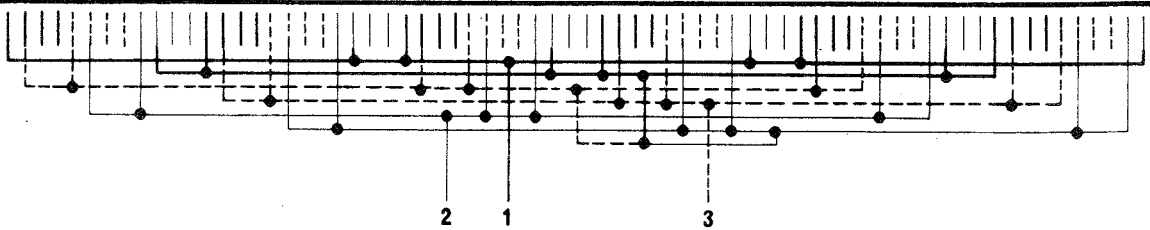
6 Cabos  
6 Kabel  
6 Leads



D



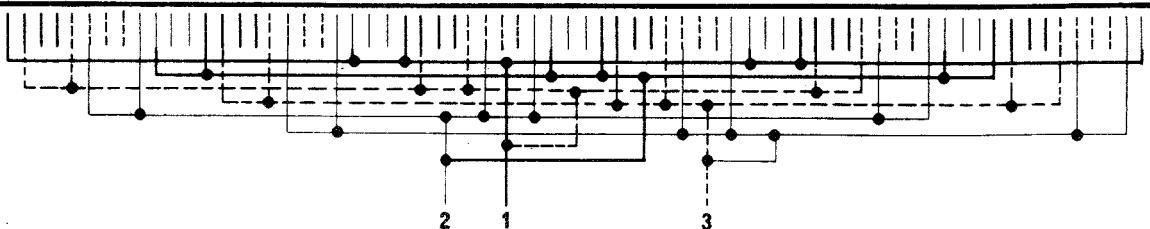
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

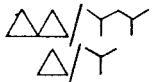
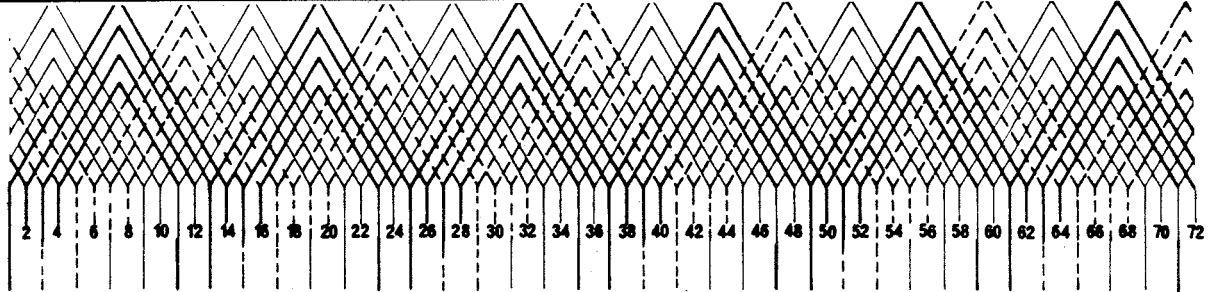
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 11/4  
(72-006-11/621-N)\*

TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	CONCÊNTRICO 6 x PARALELO	PASSO 1:8:10 :12:14
DREHSTROM	72 NUTEN	6 POLE	DOPPEL- SCHICHT	KONZENTRISCHE 6 x PARALLEL	WICKAL- 1:8:10 SCHRITT :12:14
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	CONCENTRIC 6 x PARALLEL	PITCH 1:8:10 :12:14



12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

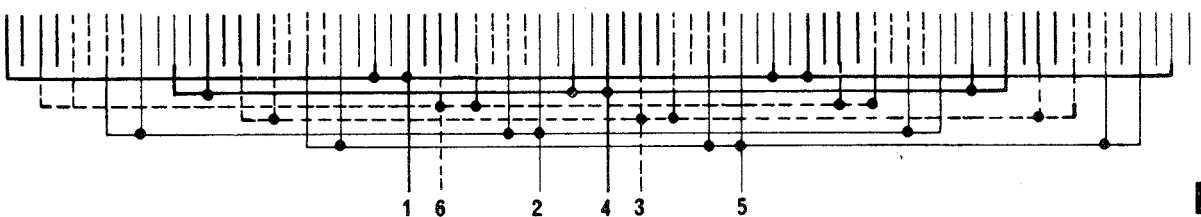


9 Cabos  
9 Kabel  
9 Leads

C



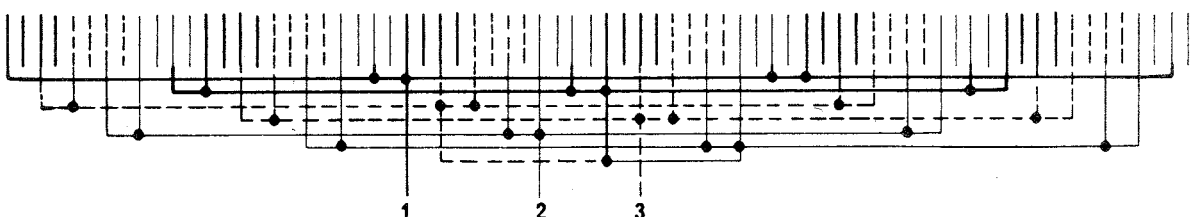
6 Cabos  
6 Kabel  
6 Leads



D



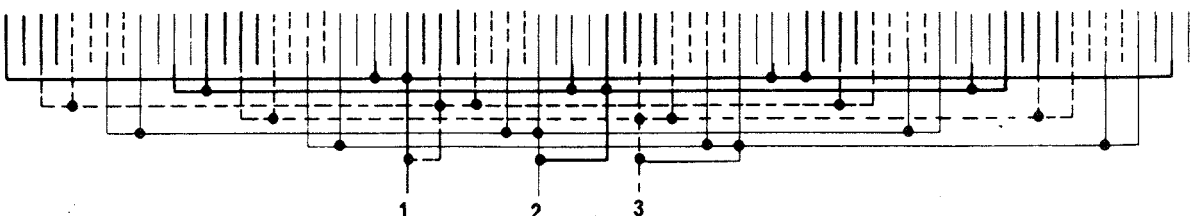
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



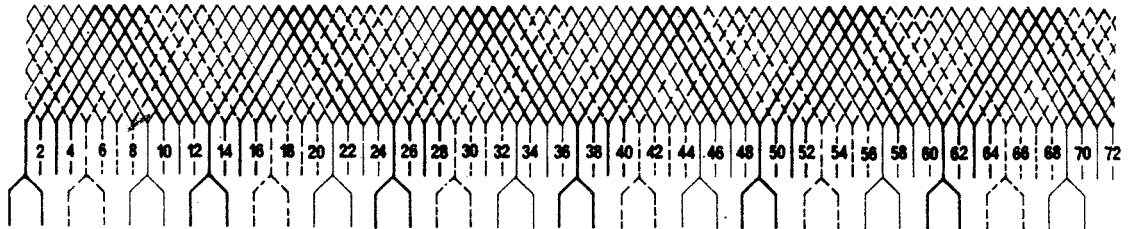
F

72 - 06 - 10/5  
(72-006-10/222-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

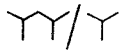


TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:10
DREHSTROM	72 NUTEN	6 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:10
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:10



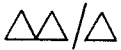
12 Cabos  
12 Kabel  
12 Leads

A



9 Cabos  
9 Kabel  
9 Leads

B

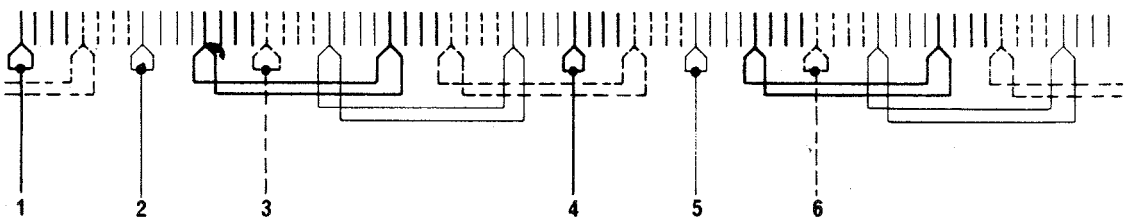


9 Cabos  
9 Kabel  
9 Leads

C



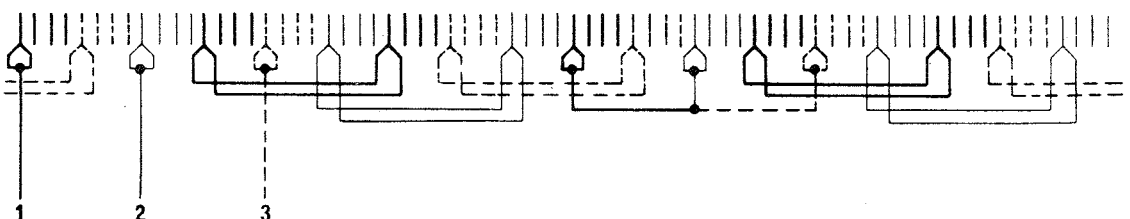
6 Cabos  
6 Kabel  
6 Leads



D



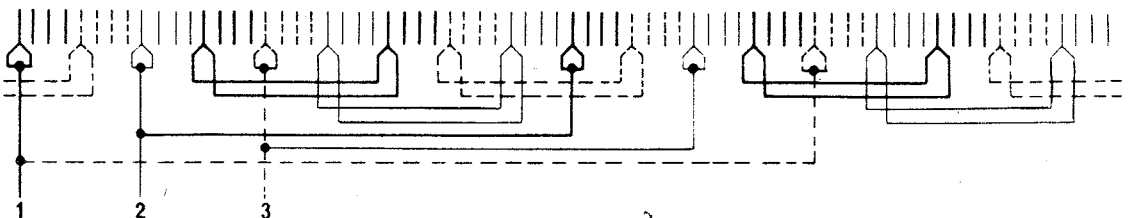
3 Cabos  
3 Kabel  
3 Leads



E



3 Cabos  
3 Kabel  
3 Leads



F

\*Nova nomenclatura

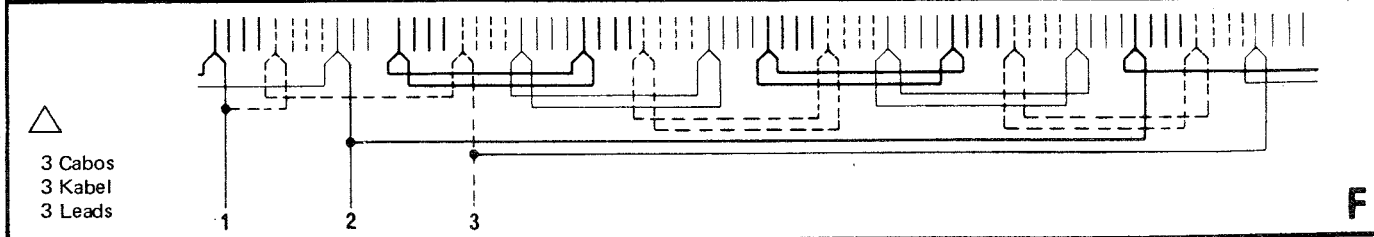
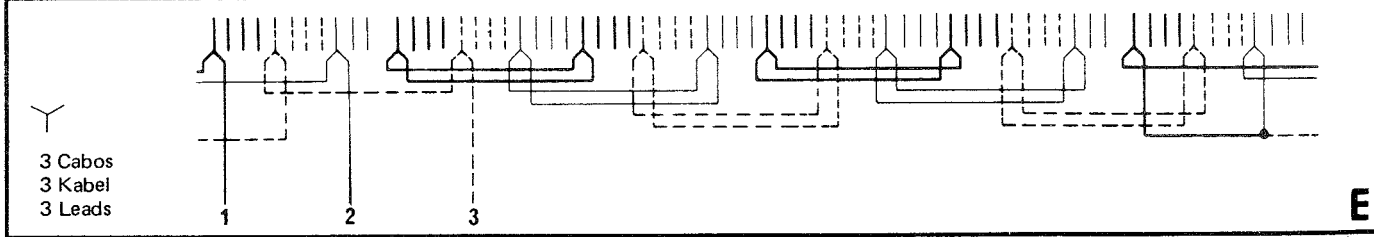
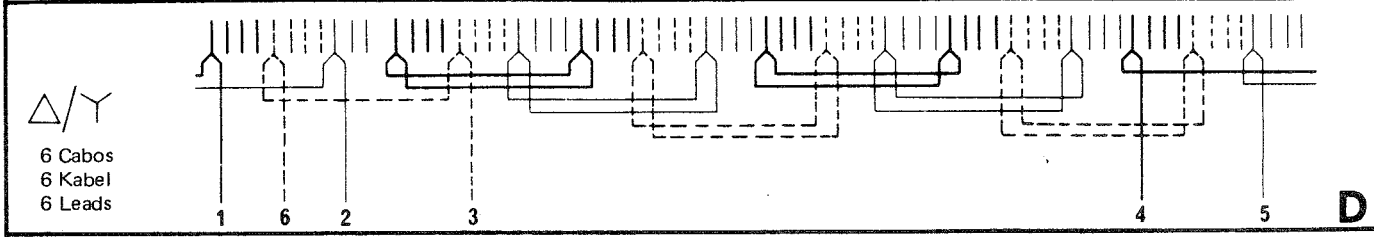
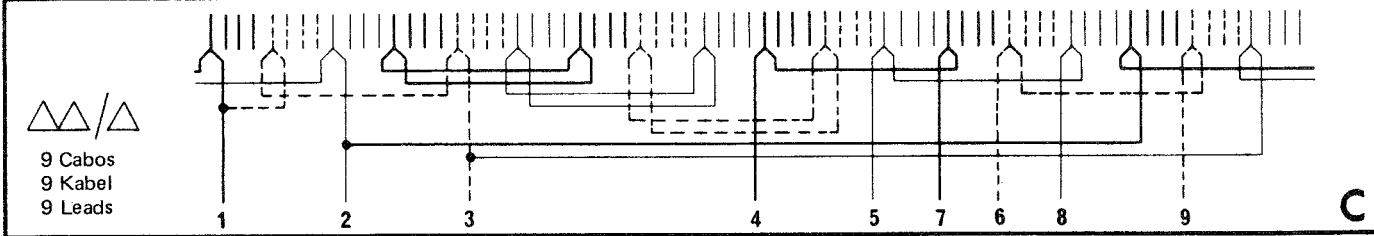
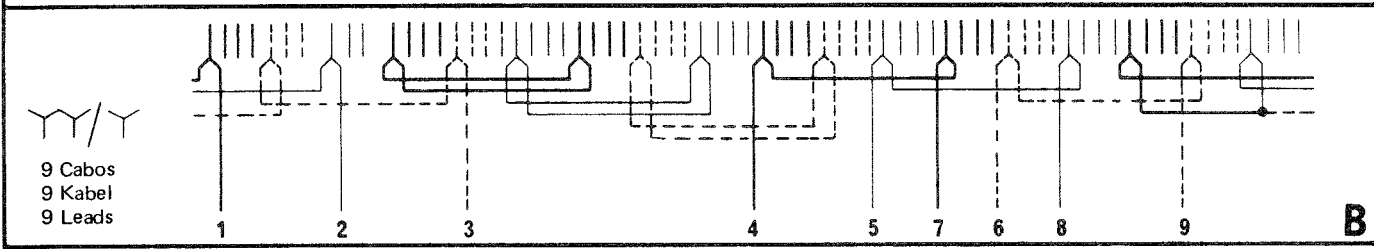
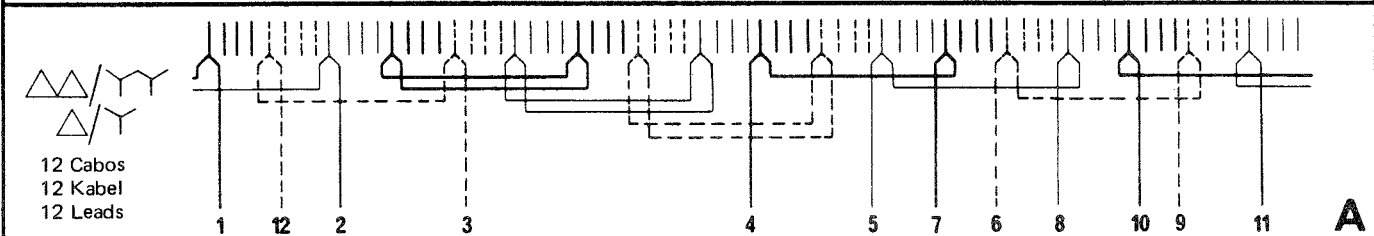
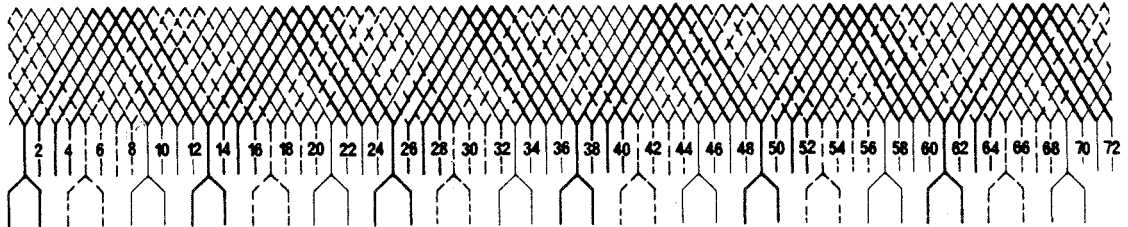




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 06 - 10/6  
(72-006-10/122-N)\*

TRIFÁSICO	72 RANHURAS	6 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:10
DREHSTROM	72 NUTEN	6 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:10
THREE-PHASE	72 SLOTS	6 POLES	TWO LAYER	SERIES LAP	PITCH 1:10



72 - 08 - 08/1  
(72-008-08/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

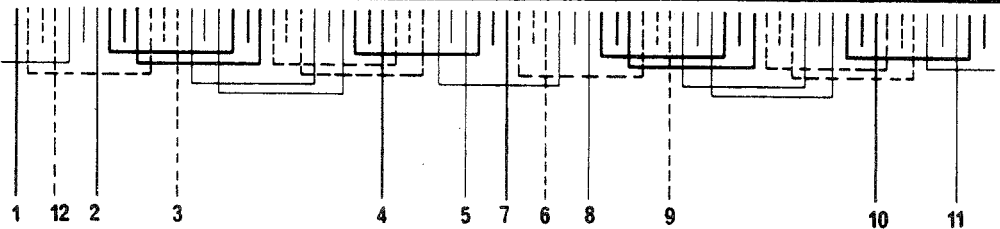
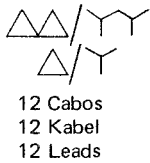
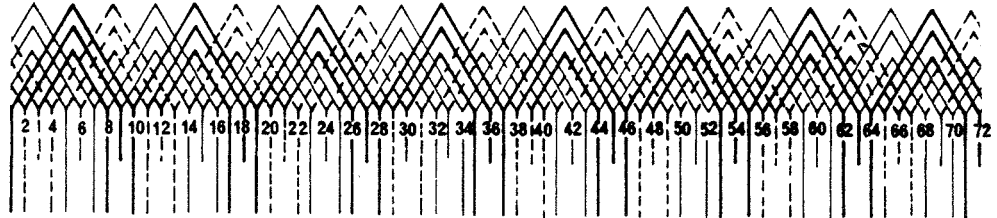
72 RANHURAS  
72 NUTEN  
72 SLOTS

8 POLOS  
8 POLE  
8 POLES

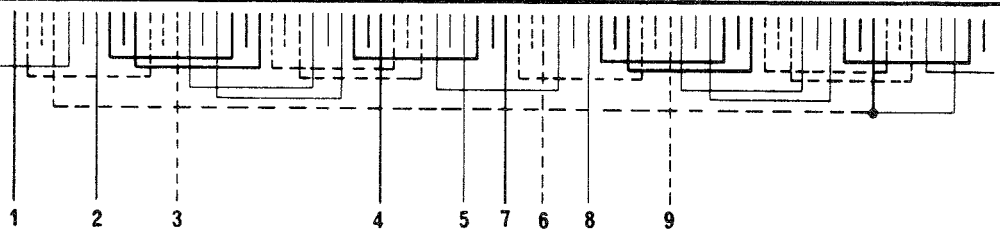
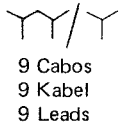
CAMADA DUPLA  
DOPPEL-  
SCHICHT  
TWO LAYER

CONCÊNTRICO  
SÉRIE  
KONZENTRISCHE  
SERIE  
SERIES  
CONCENTRIC

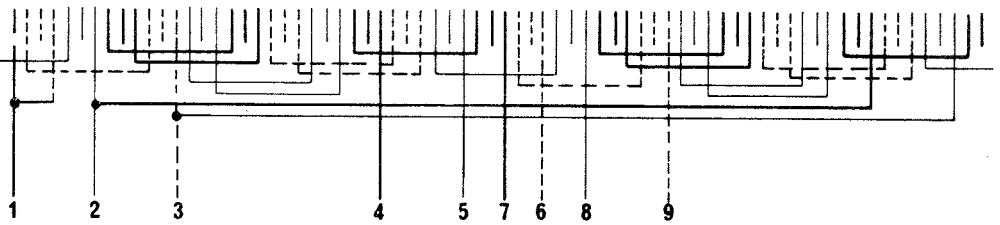
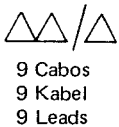
PASSO 1:6:8:10  
WICKEL-  
SCHRITT 1:6:8:10  
PITCH 1:6:8:10



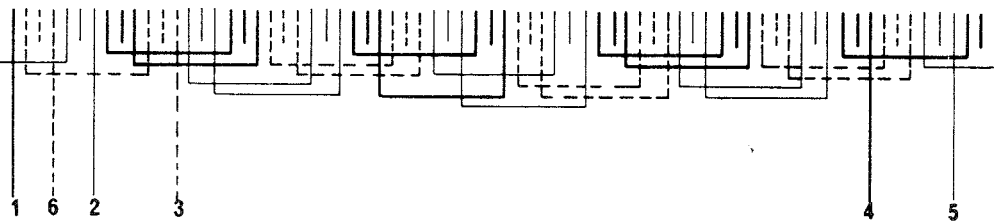
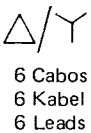
**A**



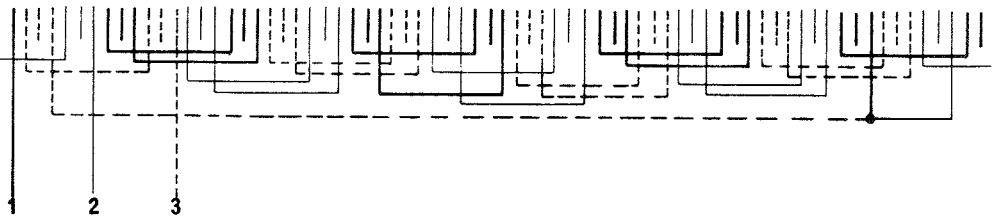
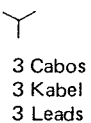
**B**



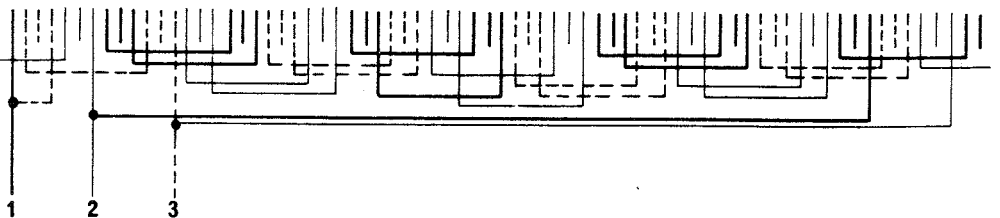
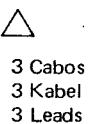
**C**



**D**



**E**



**F**

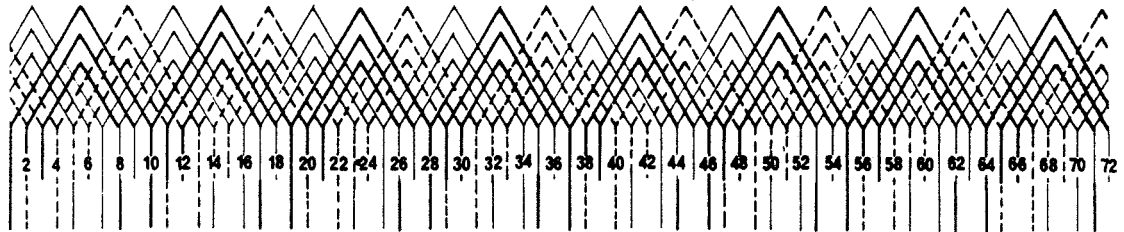
\*Nova nomenclatura




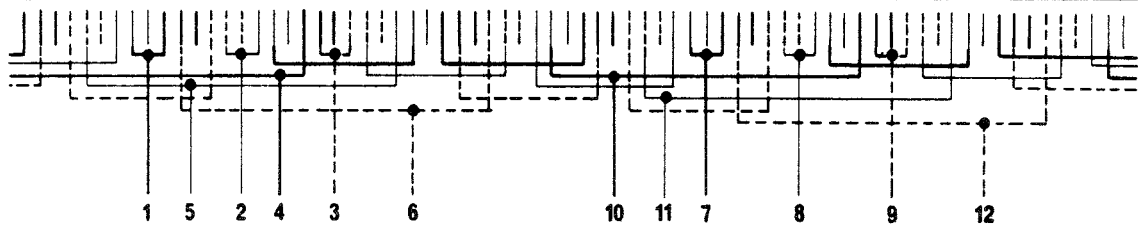
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS


72 - 08 - 08/2  
(72-008-08/221-N)\*

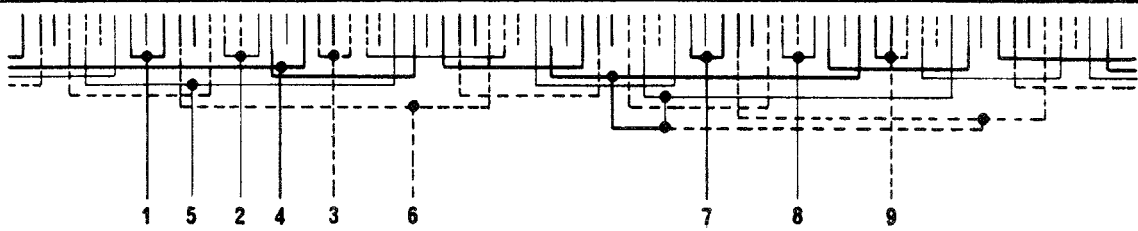
TRIFÁSICO	72 RANHURAS	8 POLOS	CAMADA DUPLA	CONCÊNTRICO PARALELO	PASSO 1:6:8:10
DREHSTROM	72 NUTEN	8 POLE	DOPPEL-SCHICHT	KONZENTRISCHE PARALLEL	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	72 SLOTS	8 POLES	TWO LAYER	PARALLEL CONCENTRIC	PITCH 1:6:8:10

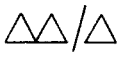


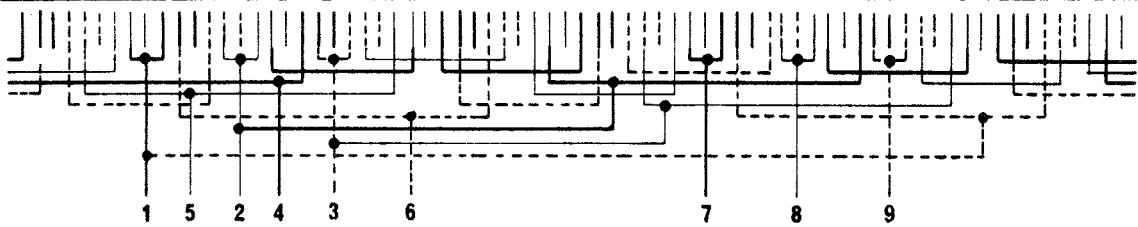
  
12 Cabos  
12 Kabel  
12 Leads




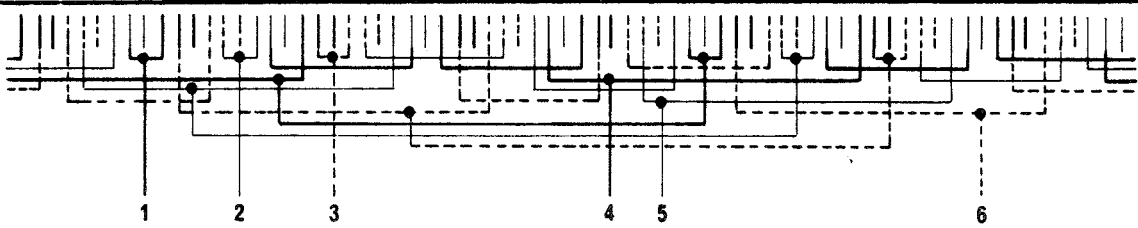
  
9 Cabos  
9 Kabel  
9 Leads




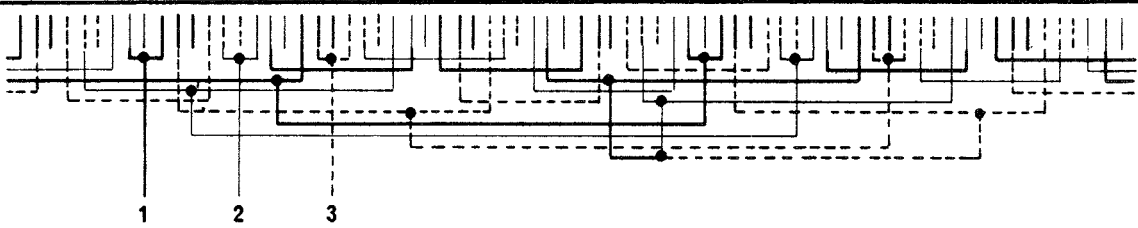
  
9 Cabos  
9 Kabel  
9 Leads




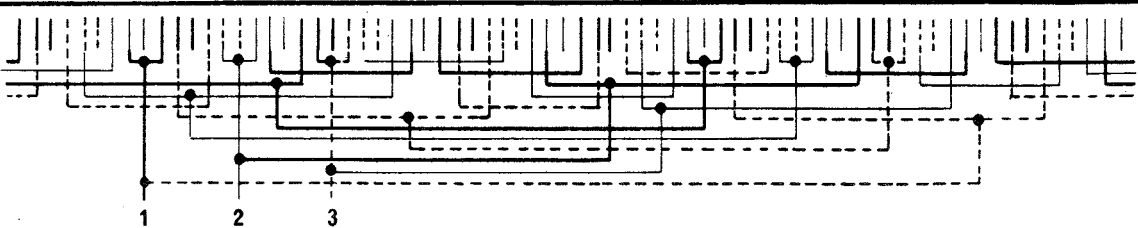
  
6 Cabos  
6 Kabel  
6 Leads



  
3 Cabos  
3 Kabel  
3 Leads



  
3 Cabos  
3 Kabel  
3 Leads

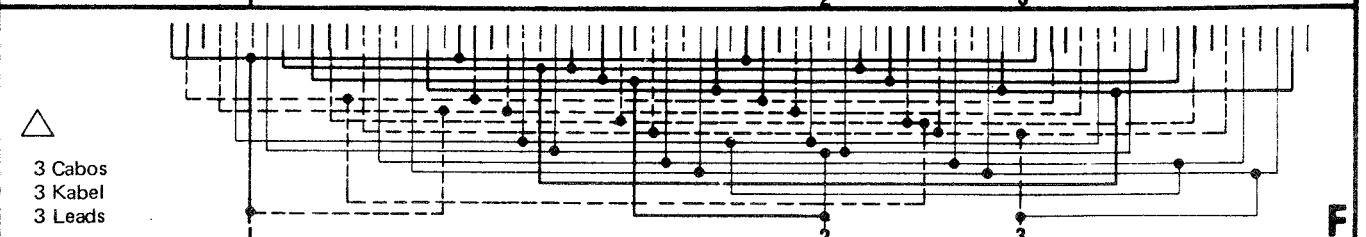
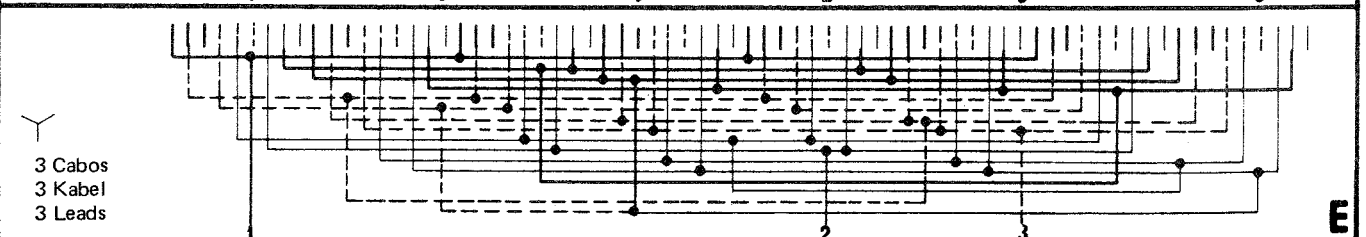
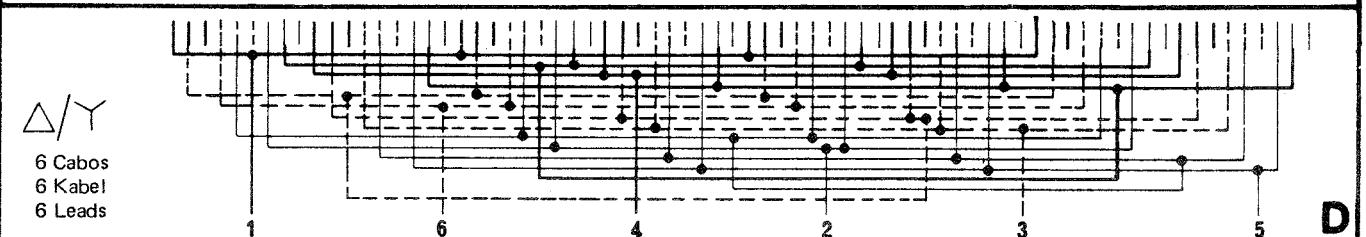
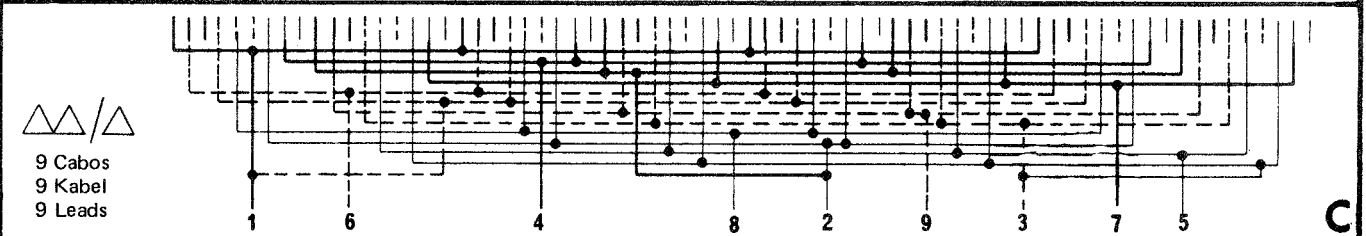
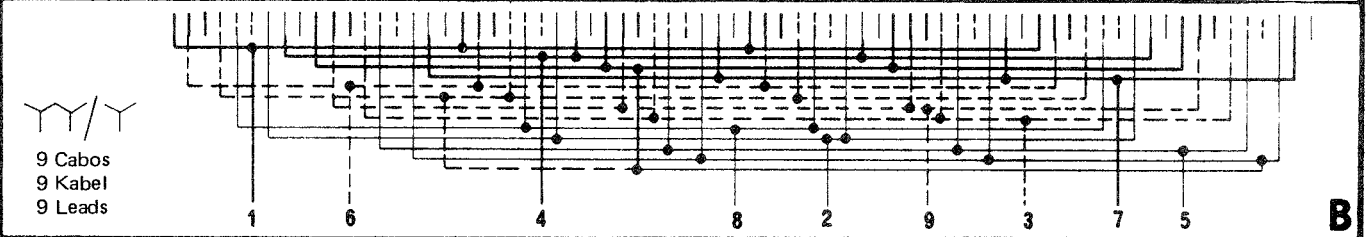
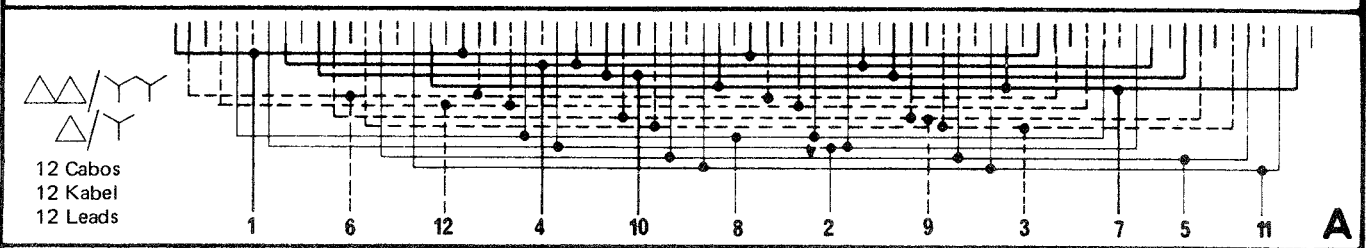
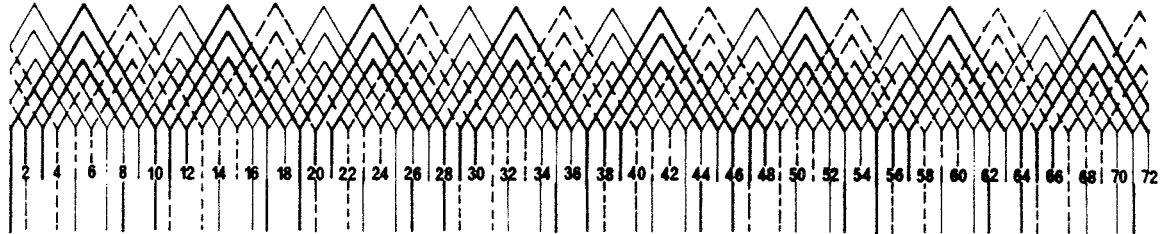


72 - 08 - 08/3  
(72-008-08/421-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	72 RANHURAS	8 POLOS	CAMADA DUPLA	CONCÊNTRICO 4 x PARALELO	PASSO 1:6:8:10
DREHSTROM	72 NUTEN	8 POLE	DOPPEL-SCHICHT	KONZENTRISCHE 4 x PARALLEL	WICKEL-SCHRITT 1:6:8:10
THREE-PHASE	72 SLOTS	8 POLES	TWO LAYER	CONCENTRIC 4 x PARALLEL	PITCH 1:6:8:10



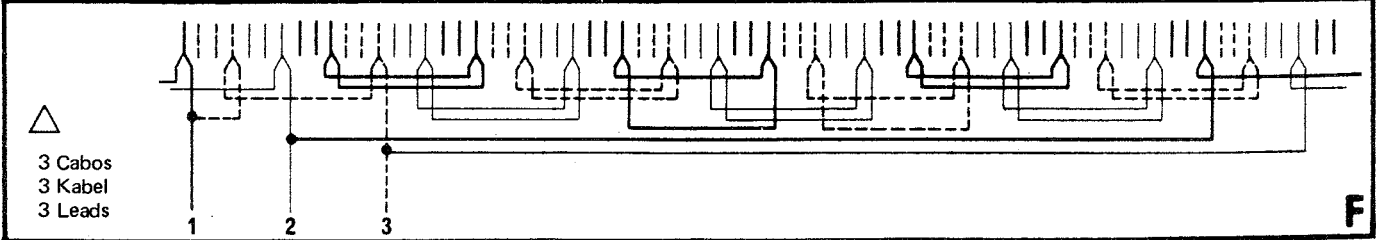
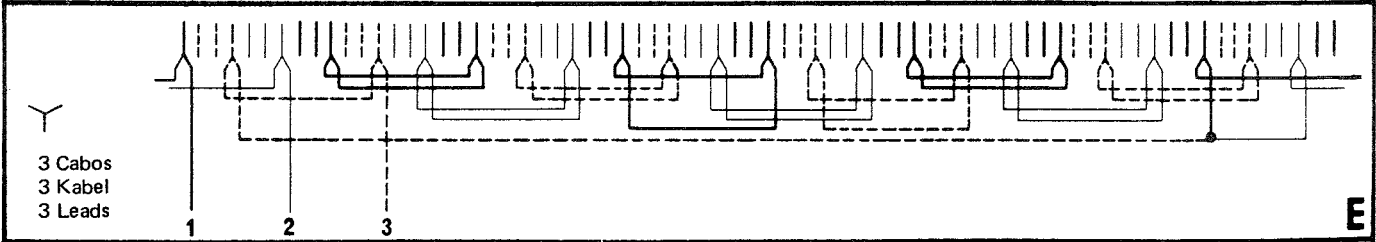
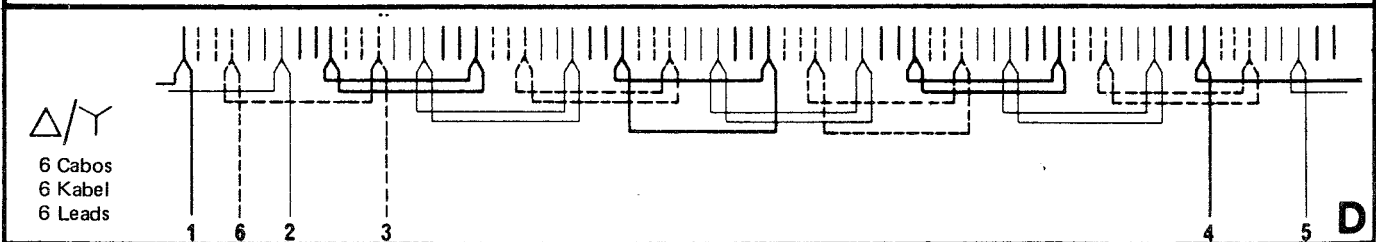
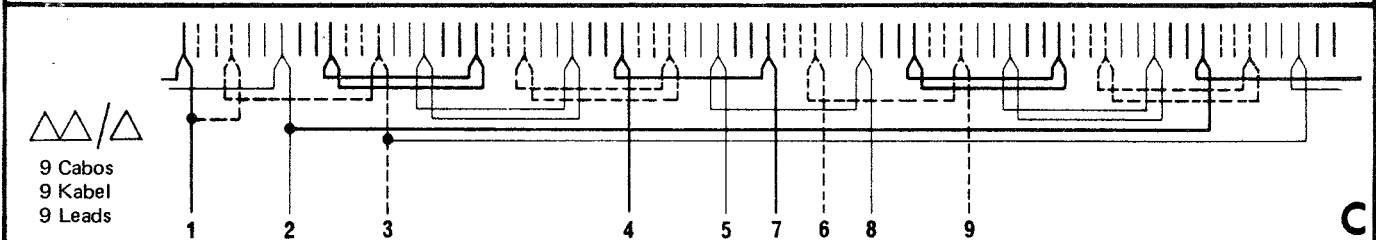
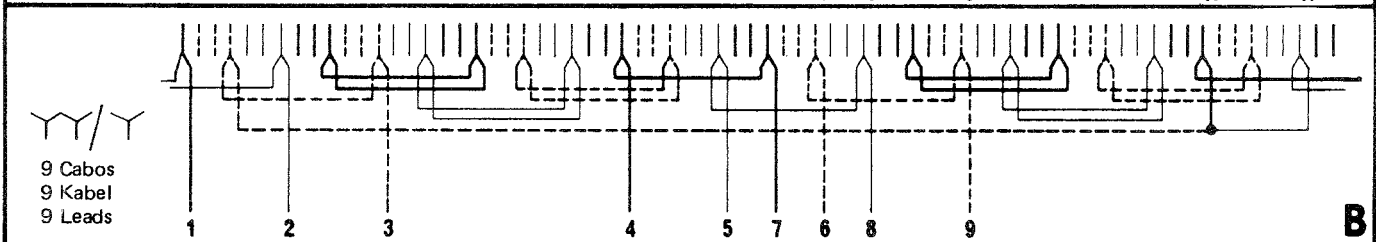
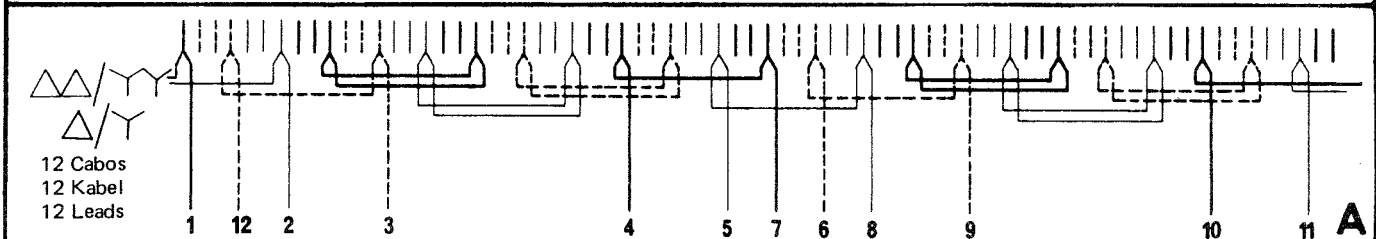
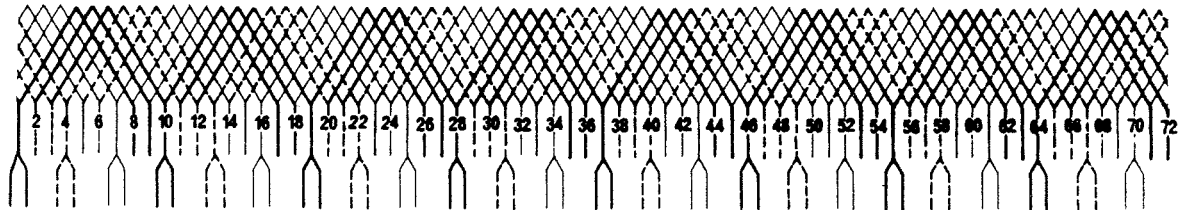
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 08 - 08/4  
(72-008-08/122-N)\*

TRIFÁSICO	72 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:8
DREHSTROM	72 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:8
THREE-PHASE	72 SLOTS	8 POLES	TWO LAYER	SERIES LAP	PITCH 1:8

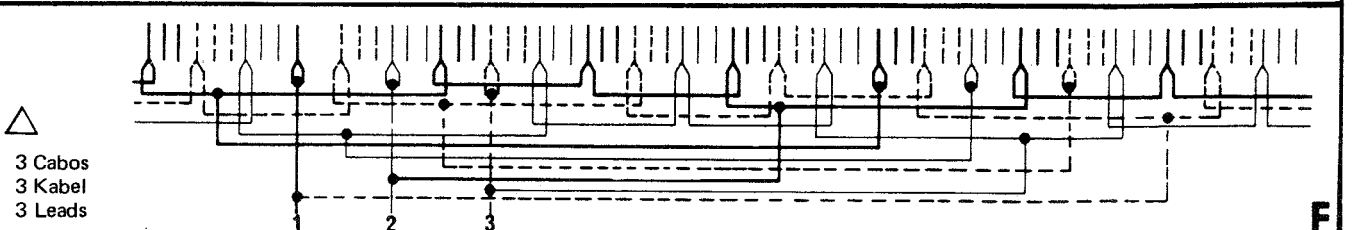
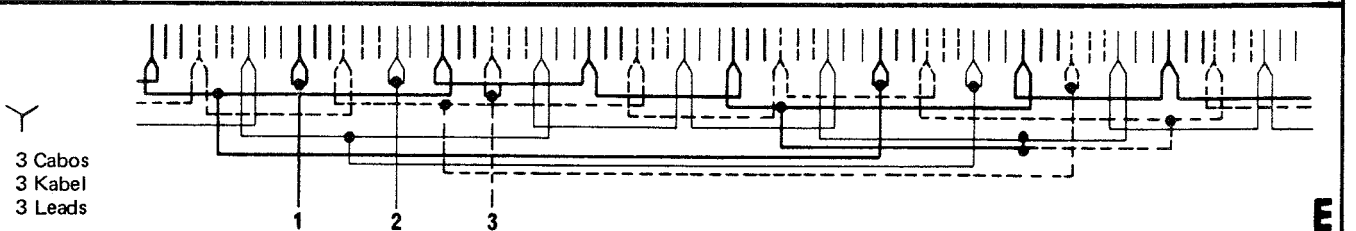
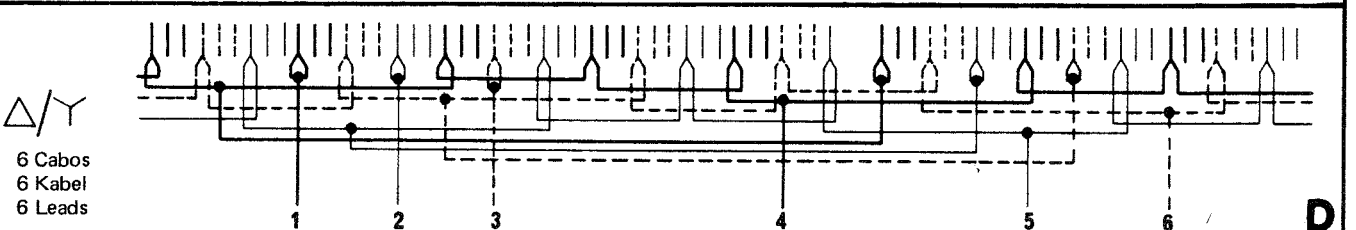
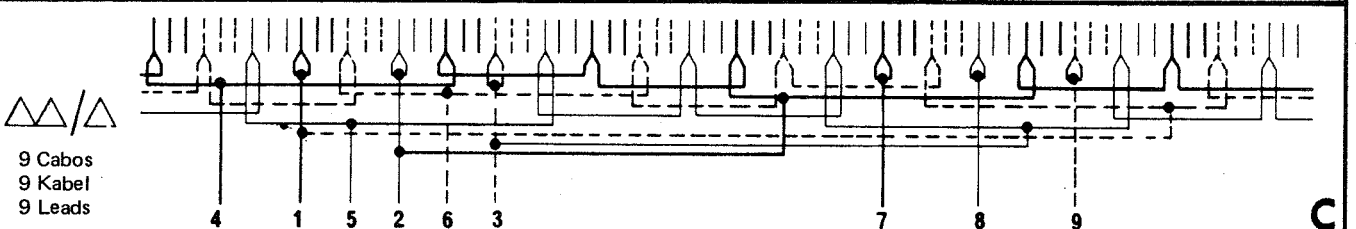
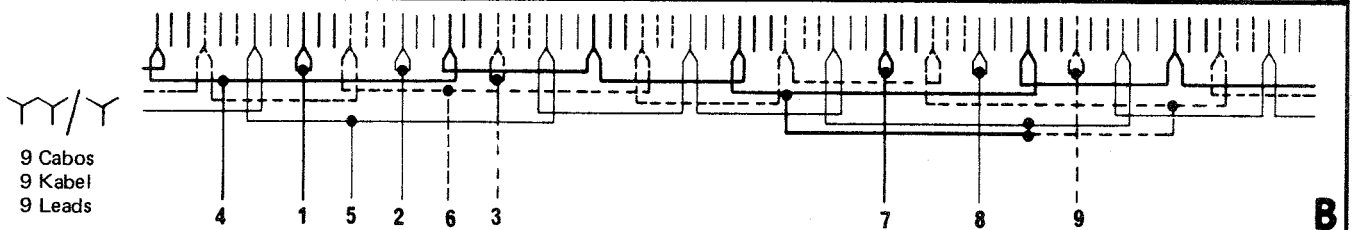
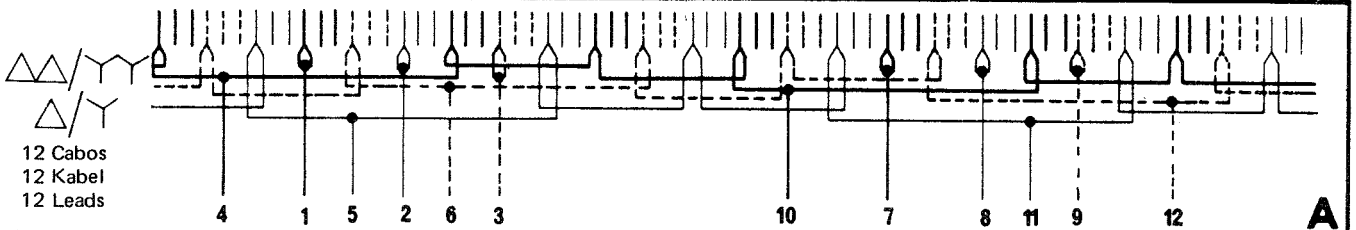
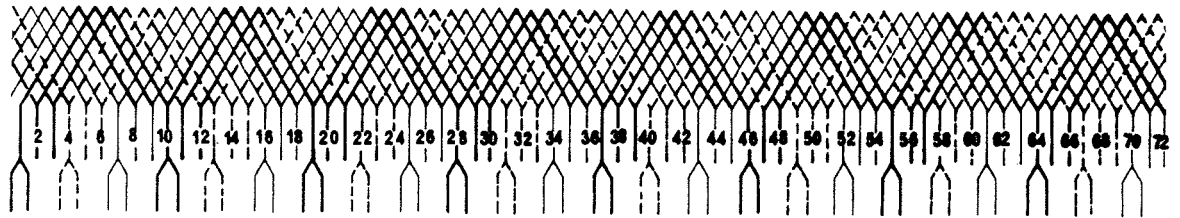


72 - 08 - 08/5  
(72-008-08/222-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	72 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO PARALELO	PASSO 1:8
DREHSTROM	72 NUTEN	8 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG PARALLEL	WICKEL-SCHRITT 1:8
THREE-PHASE	72 SLOTS	8 POLES	TWO LAYER	PARALLEL LAP	PITCH 1:8



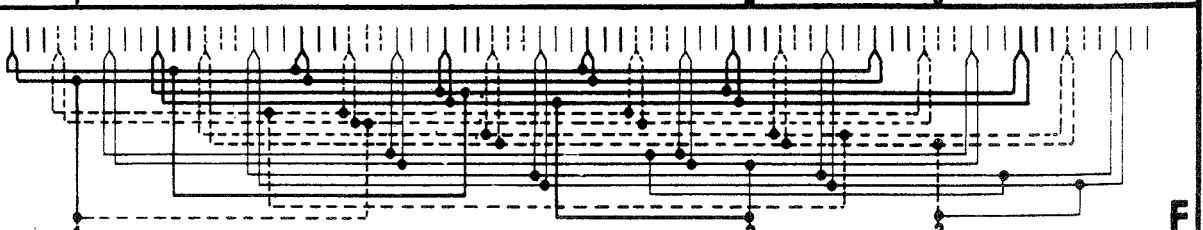
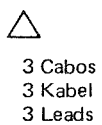
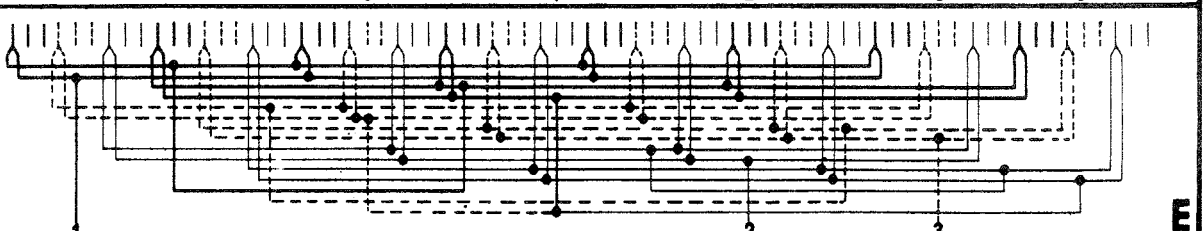
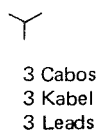
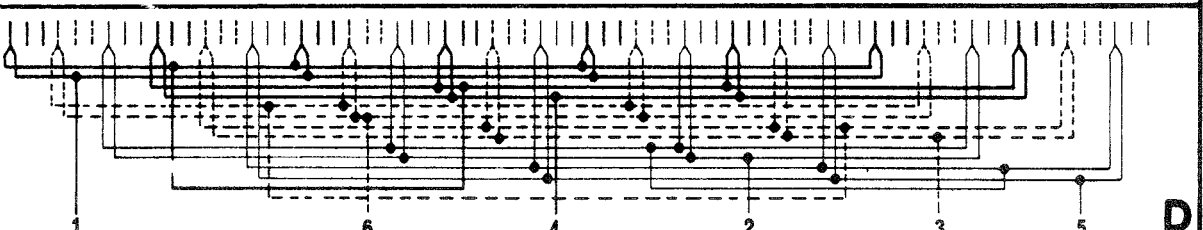
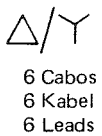
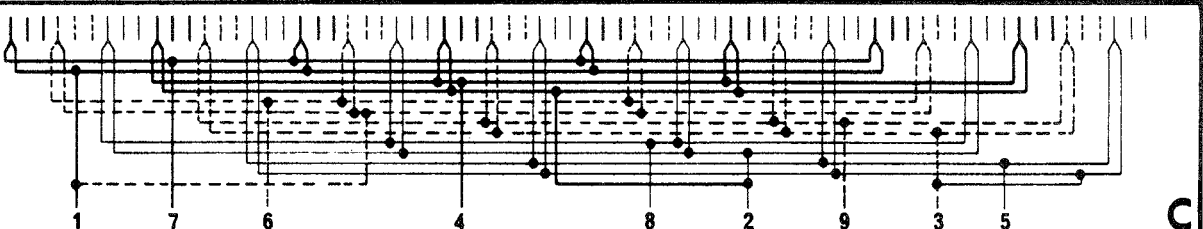
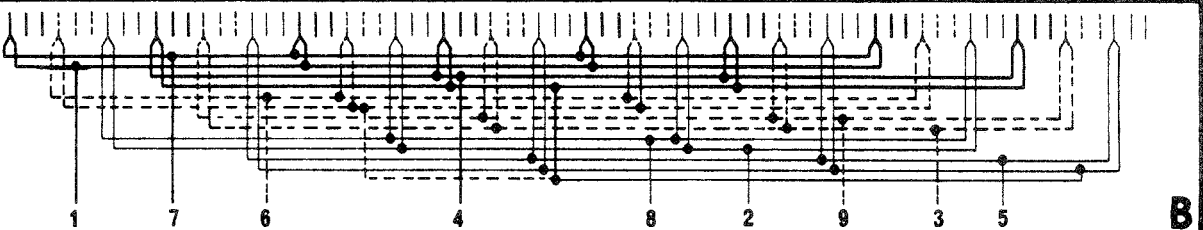
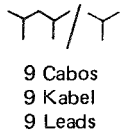
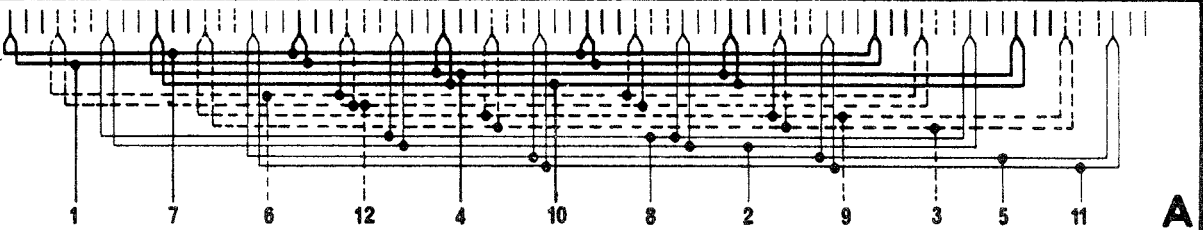
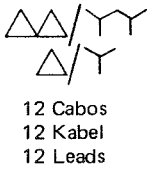
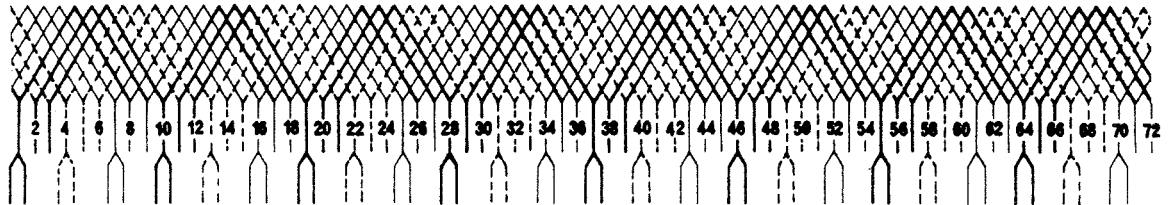
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 08 - 08/6  
(72-008-08/422-N)\*

TRIFÁSICO	72 RANHURAS	8 POLOS	CAMADA DUPLA	IMBRICADO 4 x PARALELO	PASSO 1:8
DREHSTROM	72 NUTEN	8 POLE	DOPPEL- SCHICHT	TRÄUFEL- WICKLUNG 4 x PARALLEL	WICKEL- SCHRITT 1:8
THREE-PHASE	72 SLOTS	8 POLES	TWO LAYER	LAP 4 x PARALLEL	PITCH 1:8

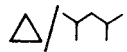
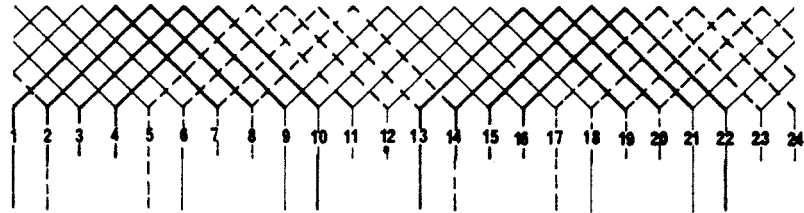


24 - 42 - 07/1  
(24-042-07/122-N)\*

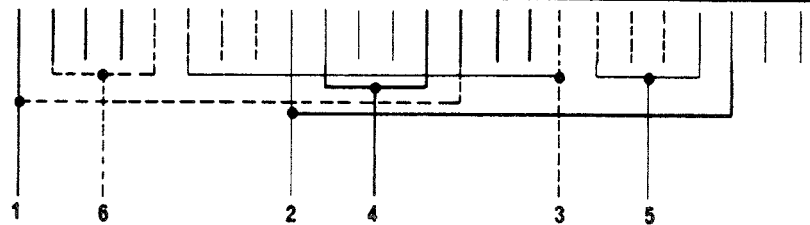
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



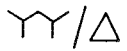
TRIFÁSICO	24 RANHURAS	4/2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:7
DRESHSTROM	24 NUTEN	4/2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:7
THREE-PHASE	24 SLOTS	4/2 POLES	TWO LAYER	SERIES LAP	PITCH 1:7



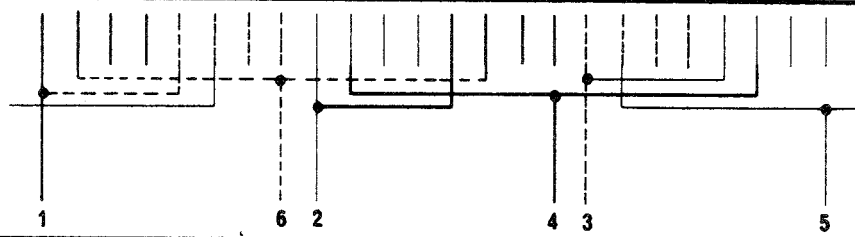
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



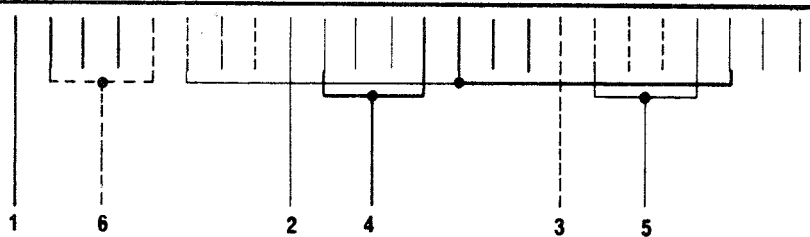
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

\*Nova nomenclatura

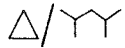
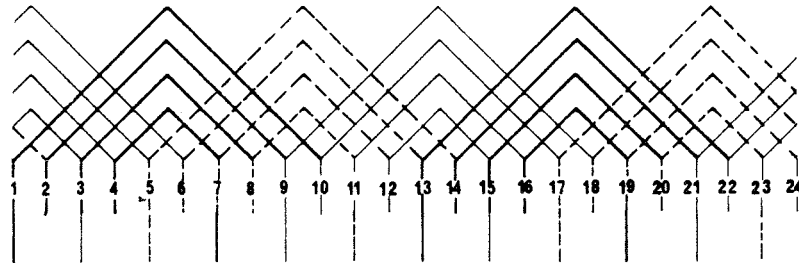




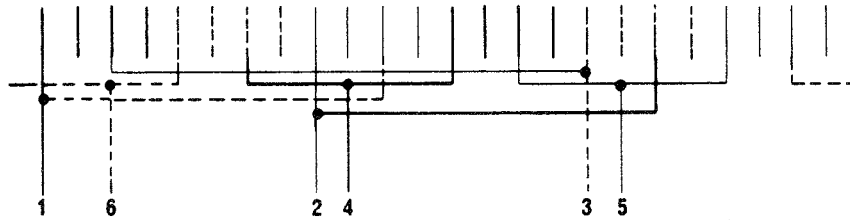
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

24 - 42 - 07/2  
(24-042-07/121-N)\*

TRIFÁSICO	24 RANHURAS	4/2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:4:6:8:10
DREHSTROM	24 NUTEN	4/2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SERIE	SCHRITT 1:4:6:8:10
THREE-PHASE	24 SLOTS	4/2 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:4:6:8:10



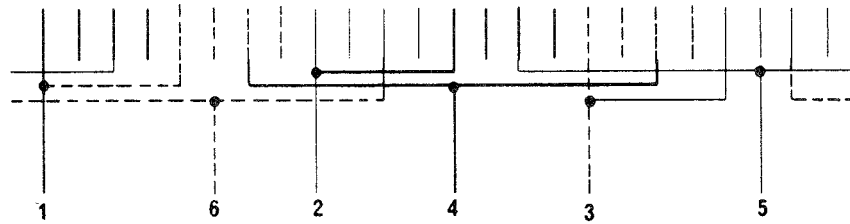
Conjugado constante  
konstantes Drehmoment  
Constant torque



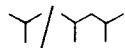
A



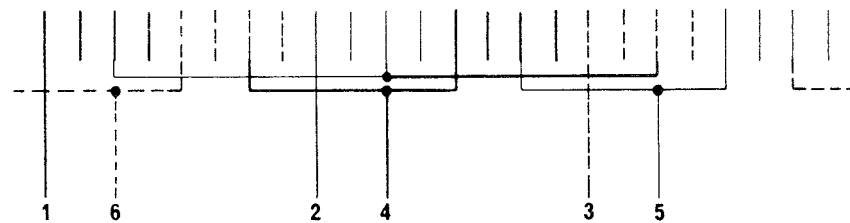
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

24 - 84 - 04/1  
(24-084-04/112-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

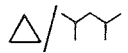
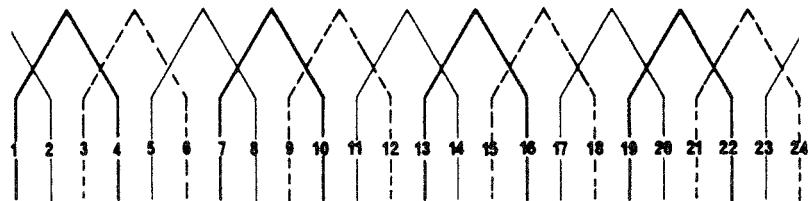
24 RANHURAS  
24 NUTEN  
24 SLOTS

8/4 POLOS  
8/4 POLE  
8/4 POLES

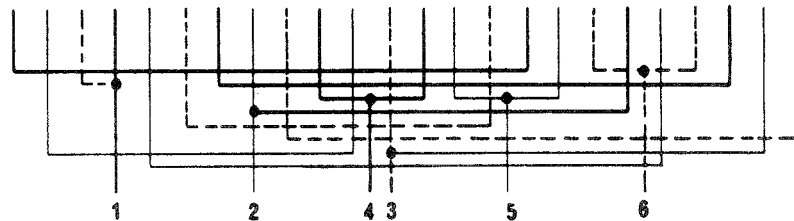
CAMADA ÚNICA  
EINZEL-SCHICHT  
SINGLE LAYER

SÉRIE  
SERIE  
SERIES

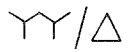
PASSO 1:4  
WICKEL-SCHRITT 1:4  
PITCH 1:4



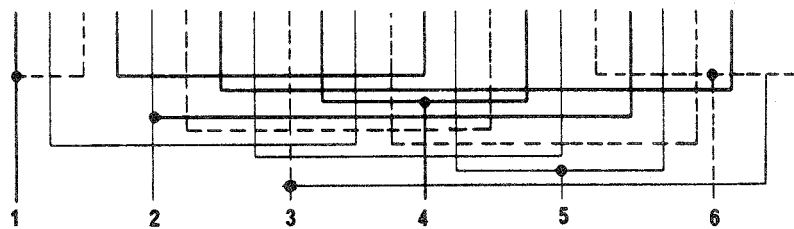
Conjugado constante  
konstantes Drehmoment  
Constant torque



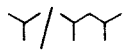
A



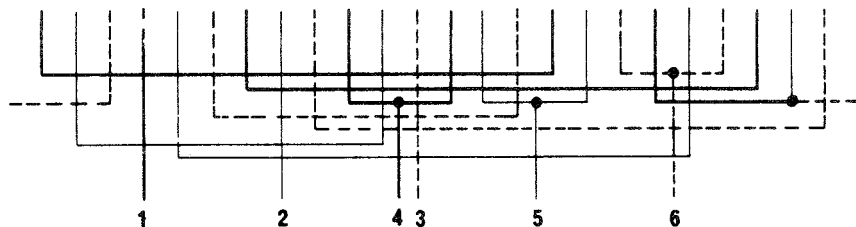
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

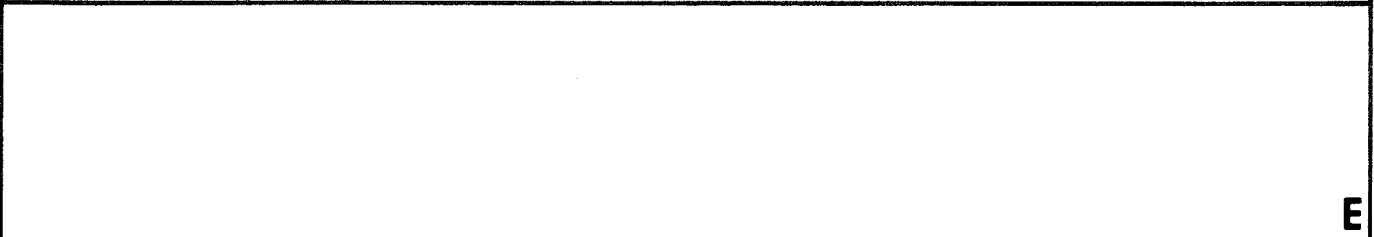
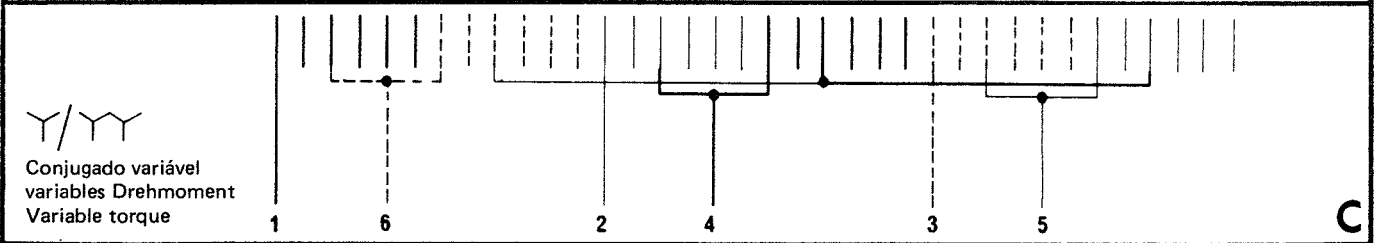
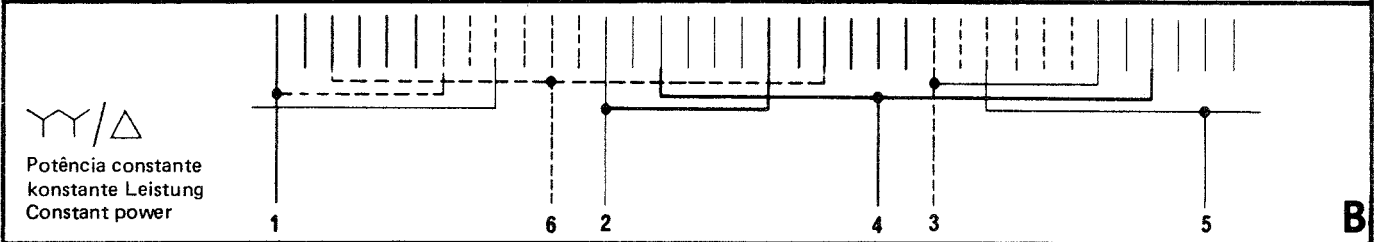
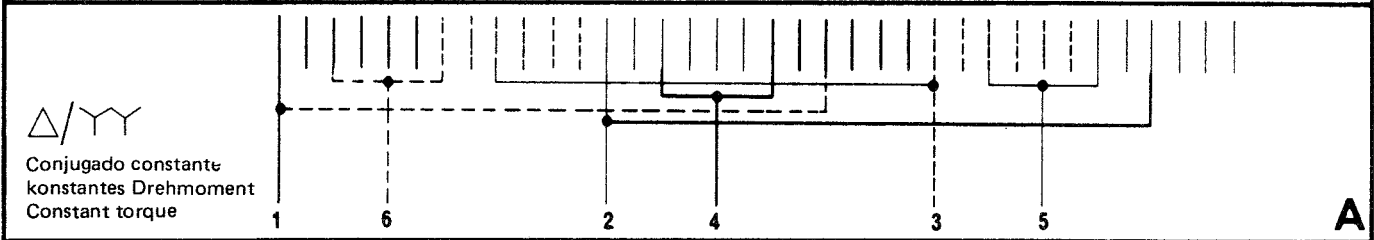
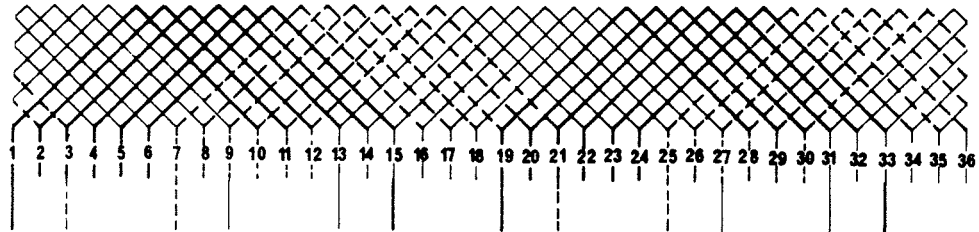
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 42 - 10/1  
(36-042-10/122-N)\*

TRIFÁSICO	36 RANHURAS	4/2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:10
DREHSTROM	36 NUTEN	4/2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SERIE	WICKEL-SCHRITT 1:10
THREE-PHASE	36 SLOTS	4/2 POLES	TWO LAYER	SERIES LAP	PITCH 1:10

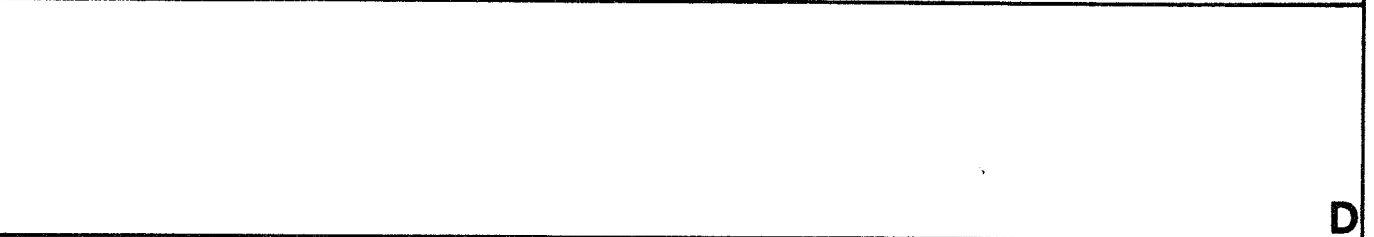
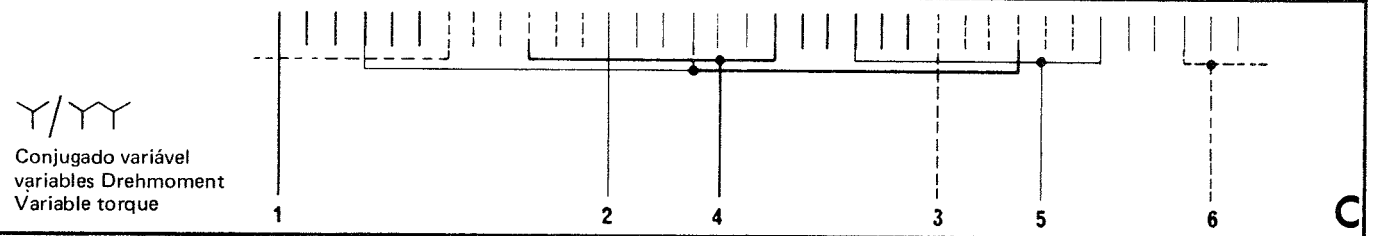
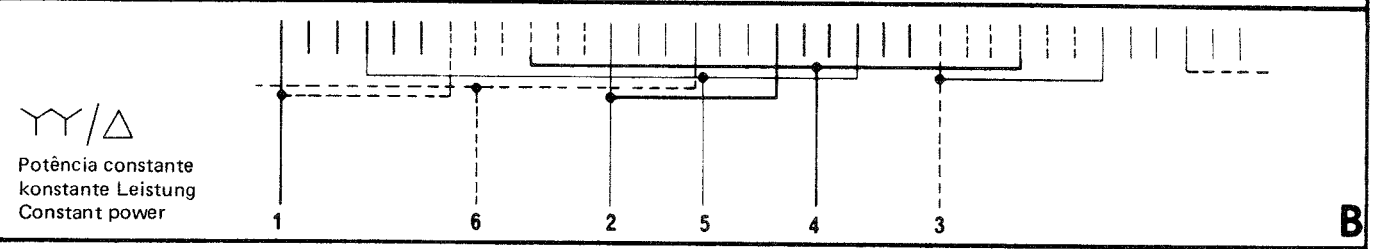
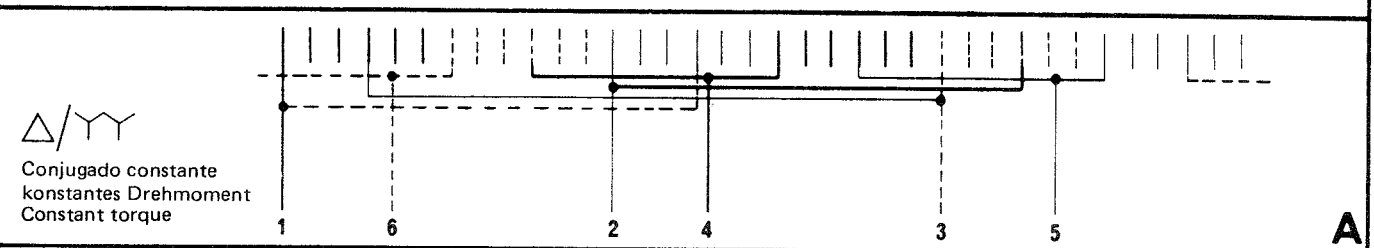
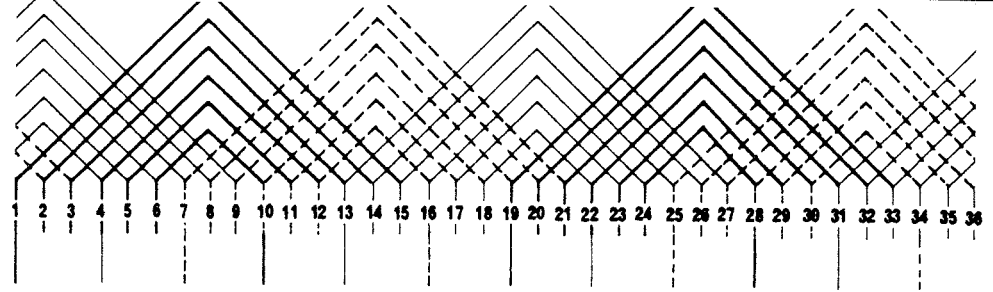


36 - 42 - 10/2  
(36-042-10/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	36 RANHURAS	4/2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:5:7:9:11: :13:15
DREHSTROM	36 NUTEN	4/2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SERIE	WICKEL-SCHRITT :13:15
THREE-PHASE	36 SLOTS	4/2 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:5:7:9:11: :13:15



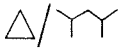
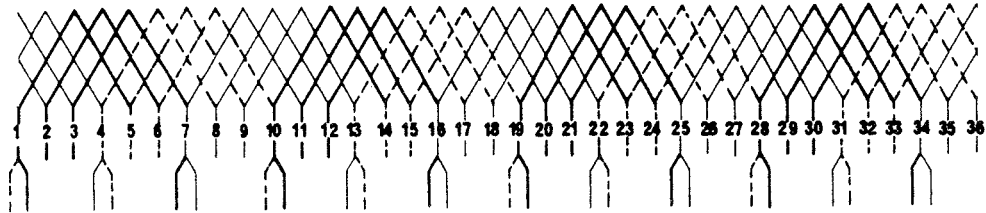
\*Nova nomenclatura



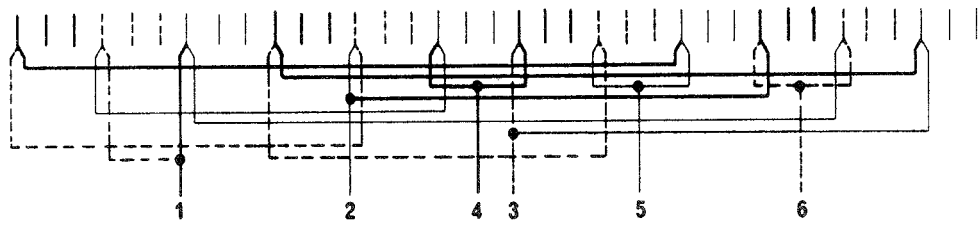
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 84 - 05/1  
(36-084-05/122-N)\*

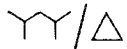
TRIFÁSICO	36 RANHURAS	8/4 POLOS	CAMADA DUPLA	IMERICADO SÉRIE	PASSO 1:5
DREHSTROM	36 NUTEN	8/4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:5
THREE-PHASE	36 SLOTS	8/4 POLES	TWO LAYER	SERIES LAP	PITCH 1:5



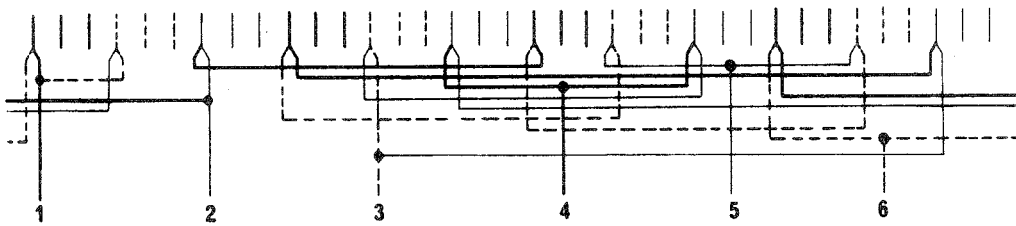
Conjugado constante  
konstantes Drehmoment  
Constant torque



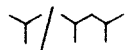
A



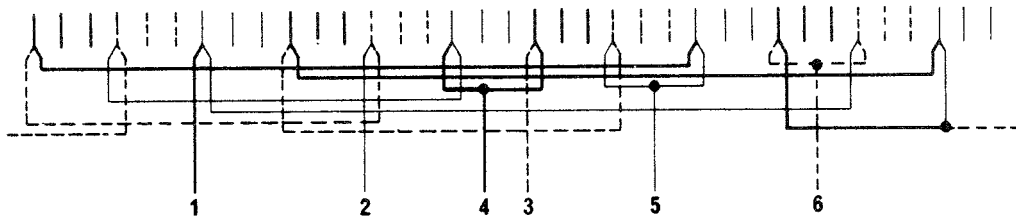
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

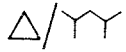
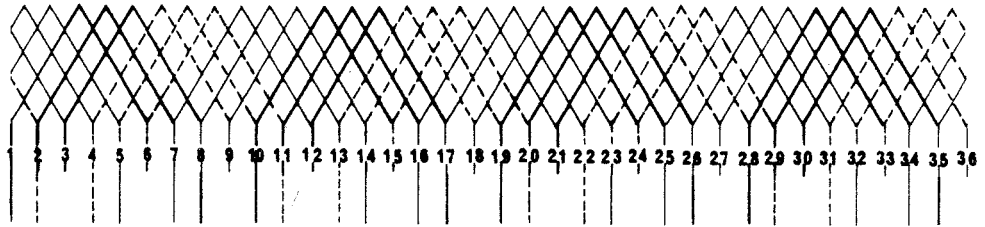
F

36 - 84 - 06/1  
(36-084-06/122-N)\*

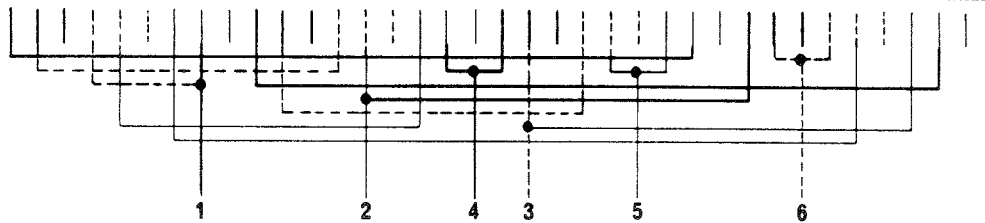
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



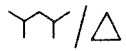
TRIFÁSICO	36 RANHURAS	8/4 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:6
DREHSTROM	36 NUTEN	8/4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:6
THREE-PHASE	36 SLOTS	8/4 POLES	TWO LAYER	SERIES LAP	PITCH 1:6



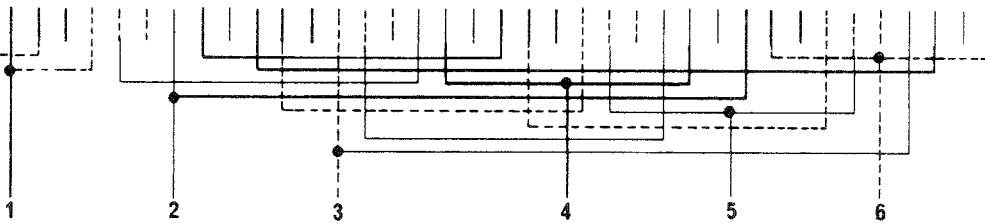
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



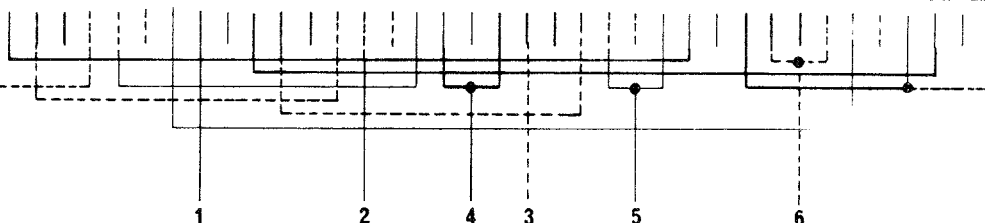
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

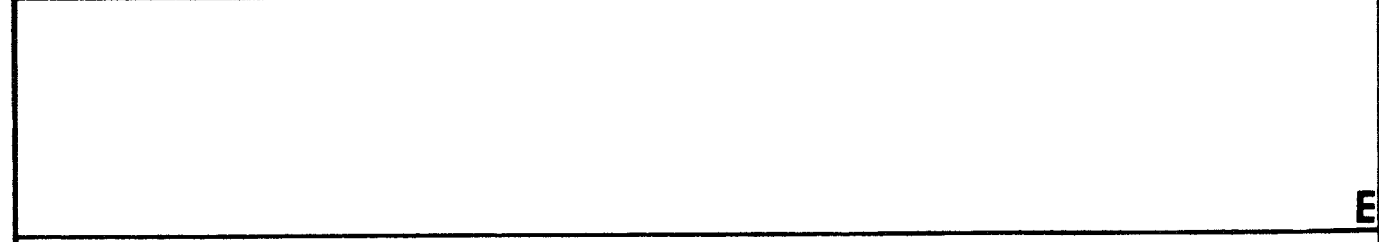
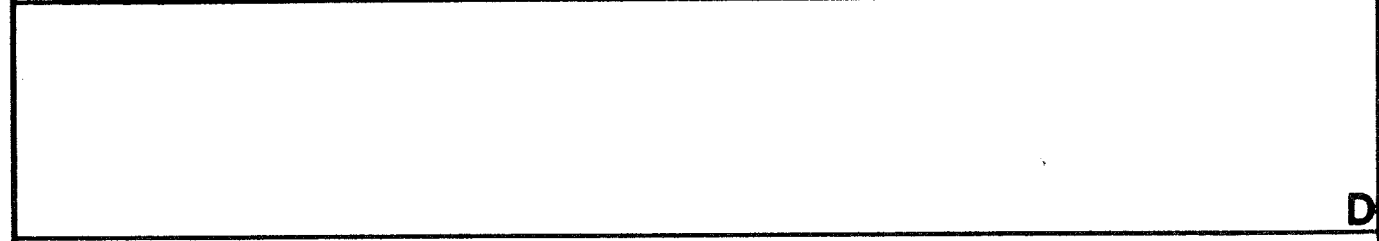
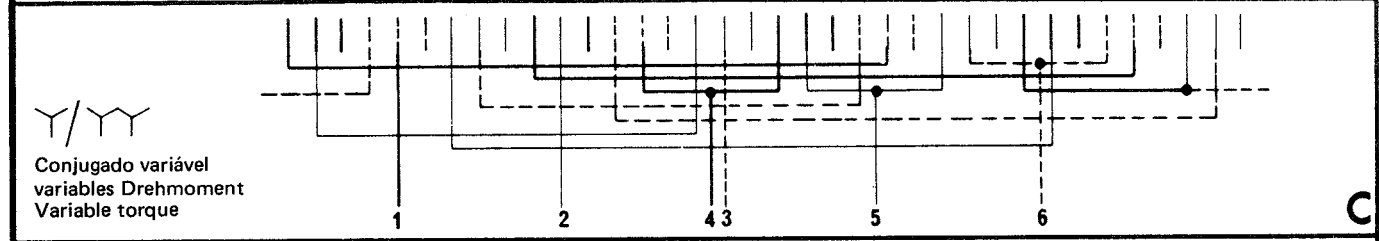
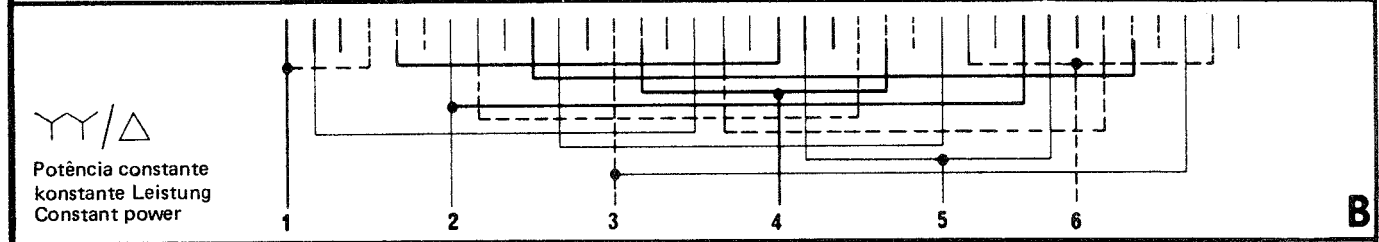
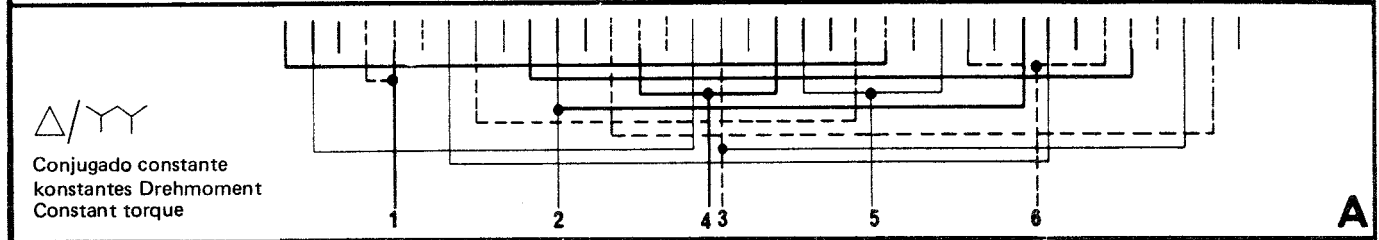
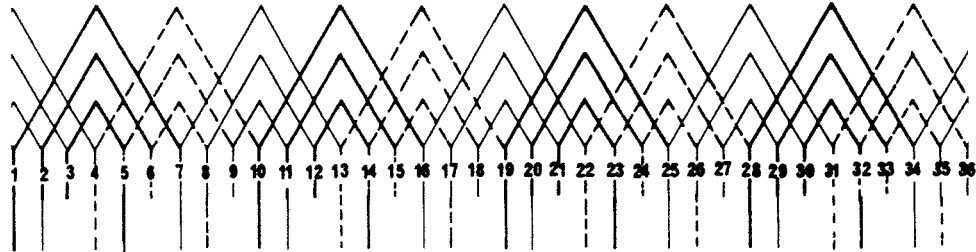
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

36 - 84 - 05/2  
(36-084-05/121-N)\*

TRIFÁSICO	36 RANHURAS	8/4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:3:5:7
DREHSTROM	36 NUTEN	8/4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:3:5:7
THREE-PHASE	36 SLOTS	8/4 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:3:5:7



36 - 84 - 06/2  
(36-084-06/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO  
DREHSTROM  
THREE-PHASE

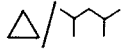
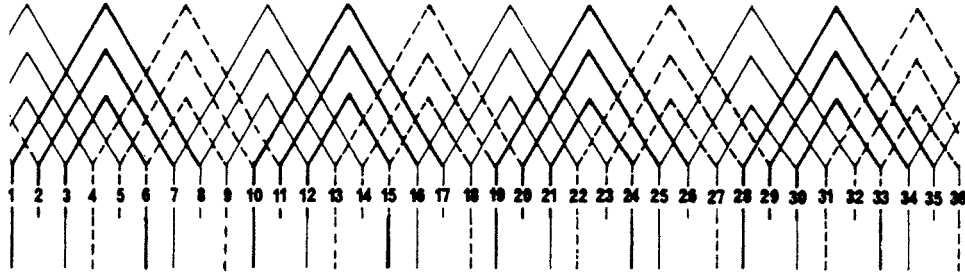
36 RANHURAS  
36 NUTEN  
36 SLOTS

8/4 POLOS  
8/4 POLE  
8/4 POLES

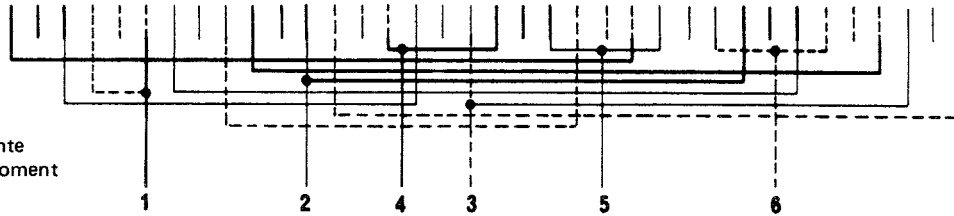
CAMADA DUPLA  
DOPPEL-SCHICHT  
TWO LAYER

CONCÊNTRICO SÉRIE  
KONZENTRISCHE SÉRIE  
SERIES CONCENTRIC

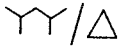
PASSO 1:4:6:8  
WICKEL-SCHRITT 1:4:6:8  
PITCH 1:4:6:8



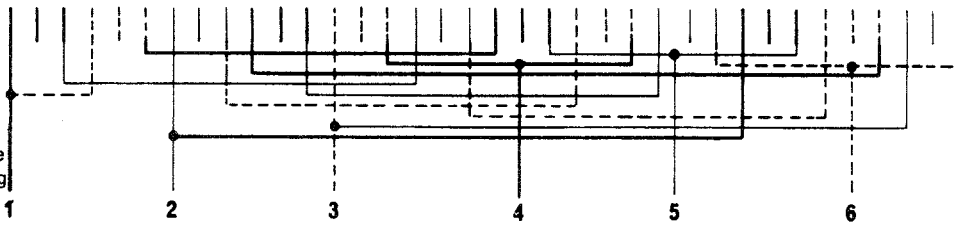
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



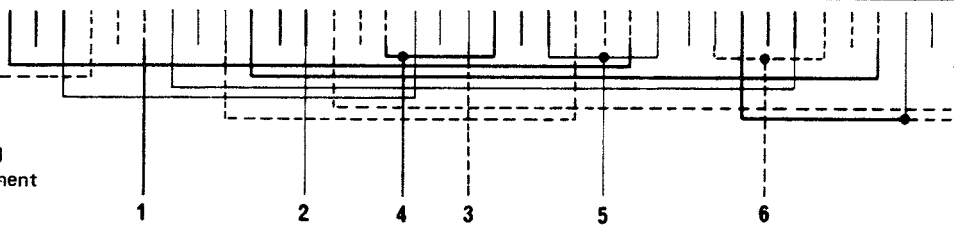
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

\*Nova nomenclatura

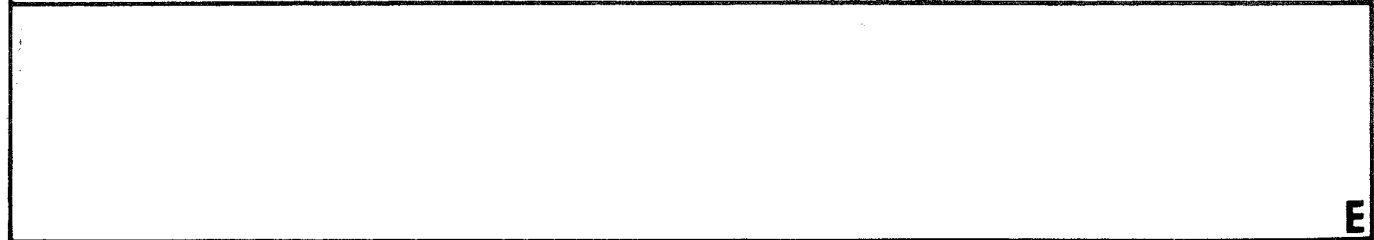
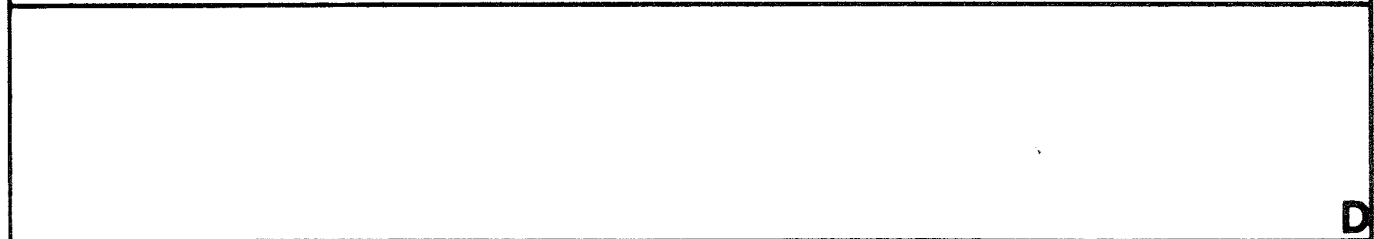
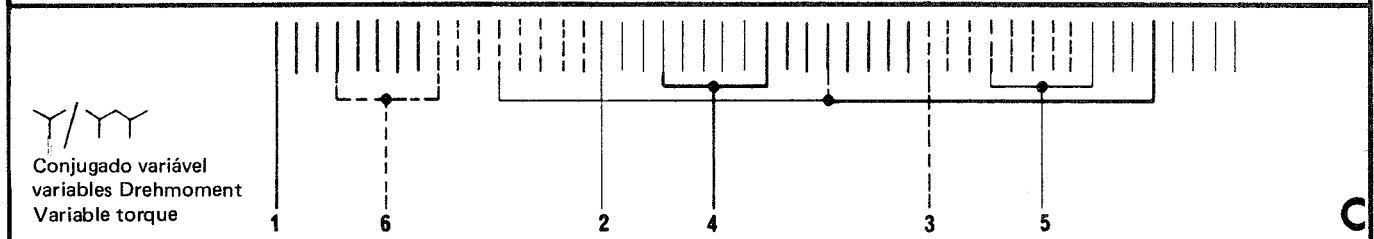
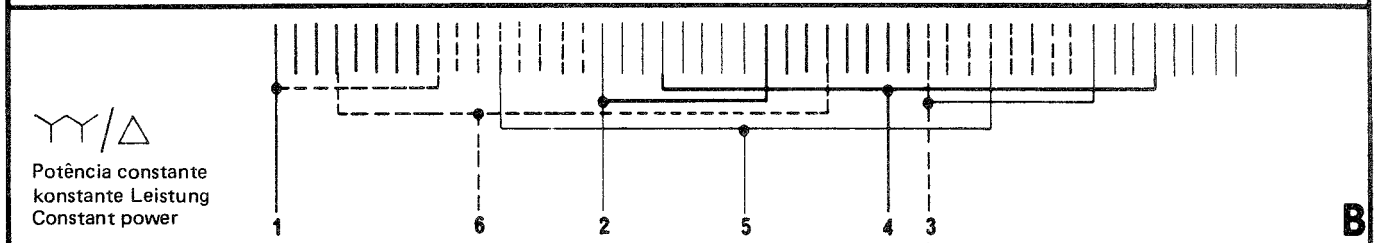
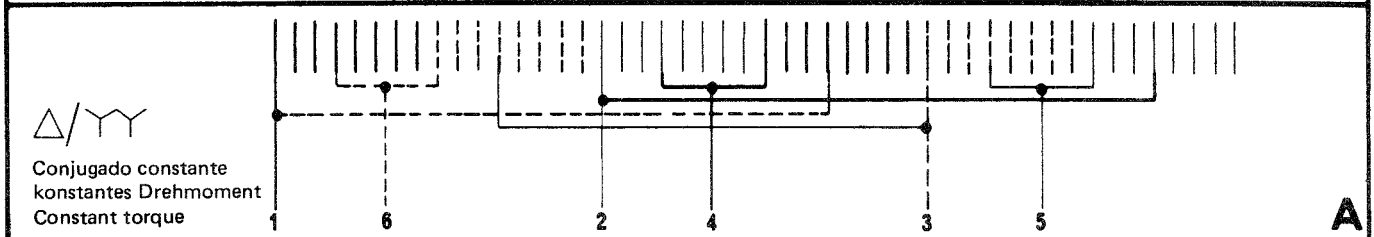
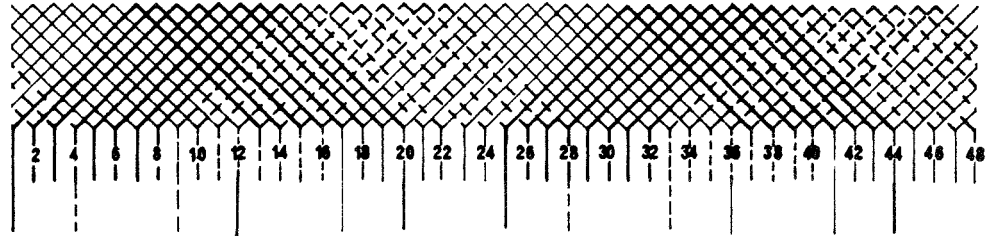




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 42 - 13/1  
(48-042-13/122-N)\*

TRIFÁSICO	48 RANHURAS	4/2 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:13
DREHSTROM	48 NUTEN	4/2 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:13
THREE-PHASE	48 SLOTS	4/2 POLES	TWO LAYER	SERIES LAP	PITCH 1:13



48 - 42 - 13/2  
(48-042-13/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

48 RANHURAS

4/2 POLOS

CAMADA DUPLA

CONCÊNTRICO SÉRIE

PASSO 1:10:12:14:16

DREHSTROM

48 NUTEN

4/2 POLE

DOPPEL-SCHICHT

KONZENTRISCHE SÉRIE

WICKEL- 1:10:12: SCHRITT :14:16

THREE-PHASE

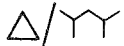
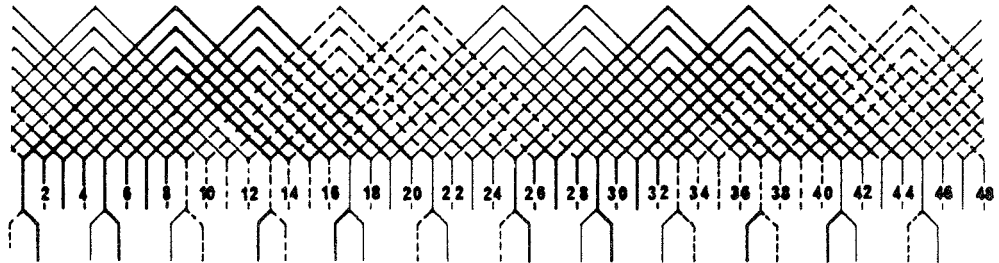
48 SLOTS

4/2 POLES

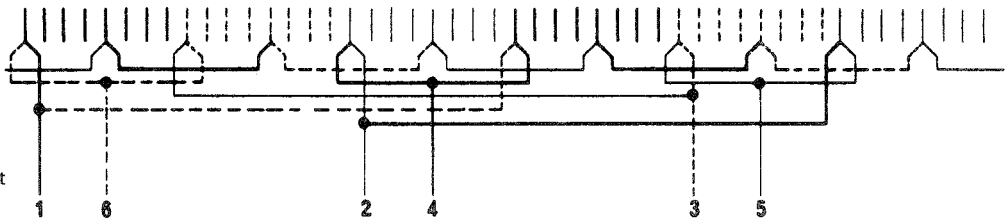
TWO LAYER

SERIES CONCENTRIC

PITCH 1:10:12:14:16



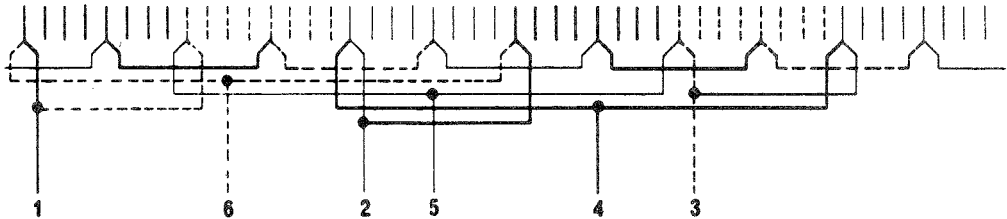
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



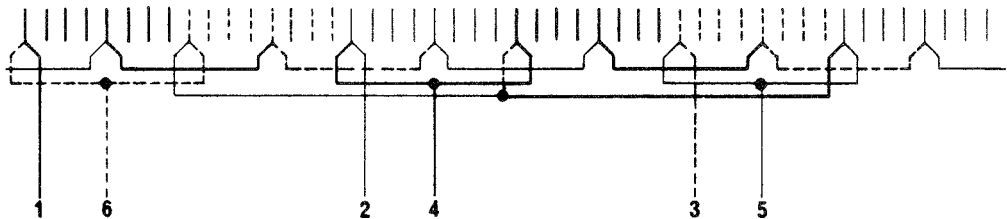
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

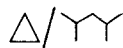
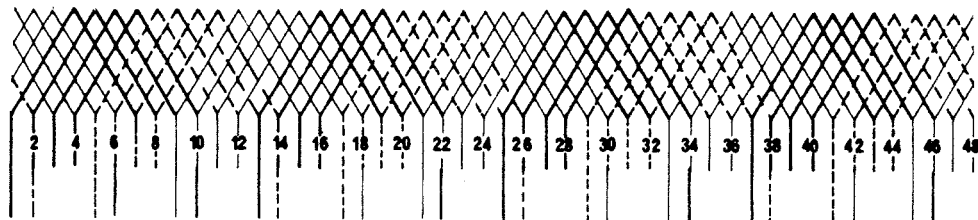
\*Nova nomenclatura



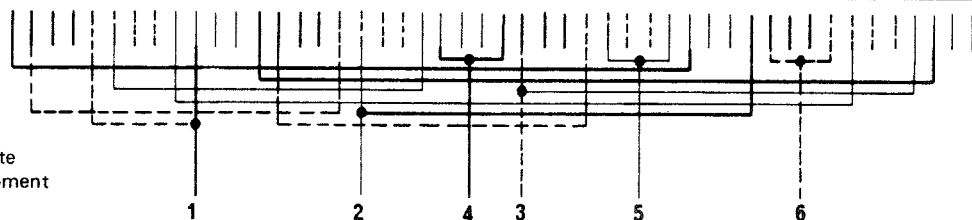
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 84 - 07/1  
(48-084-07/122-N)\*

TRIFÁSICO	48 RANHURAS	8/4 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:7
DREHSTROM	48 NUTEN	8/4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:7
THREE-PHASE	48 SLOTS	8/4 POLES	TWO LAYER	SERIES LAP	PITCH 1:7



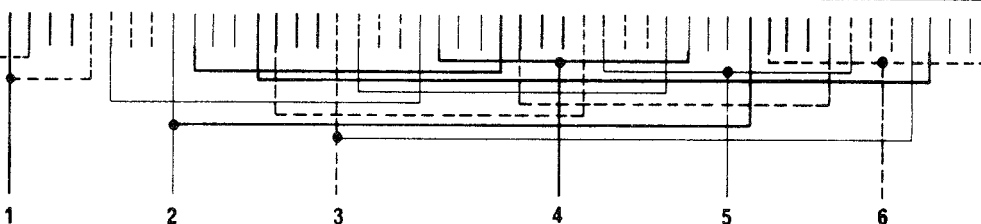
Conjugado constante  
konstantes Drehmoment  
Constant torque



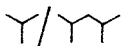
A



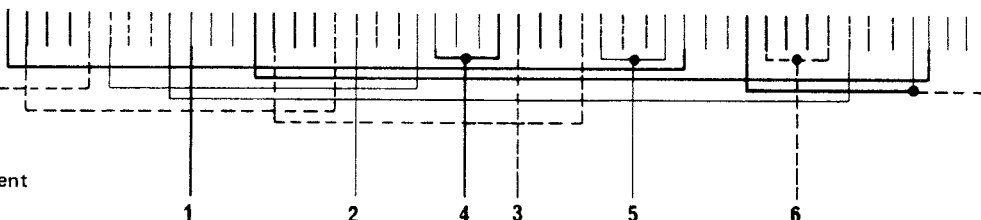
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

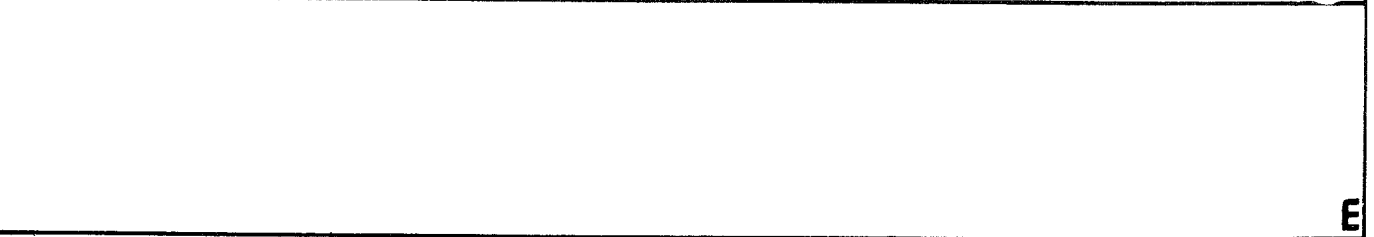
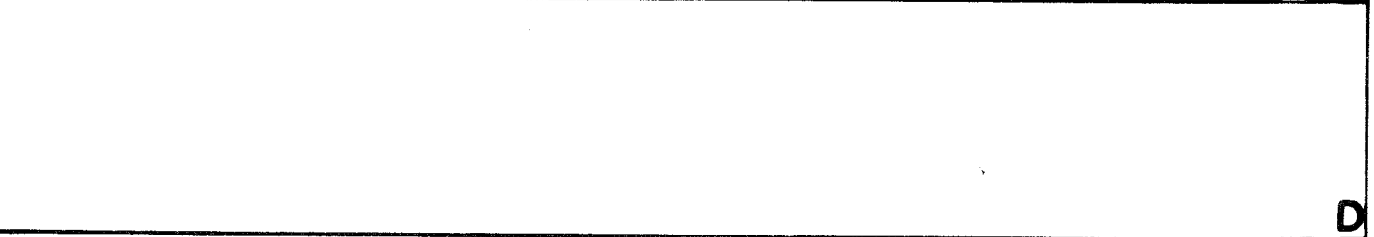
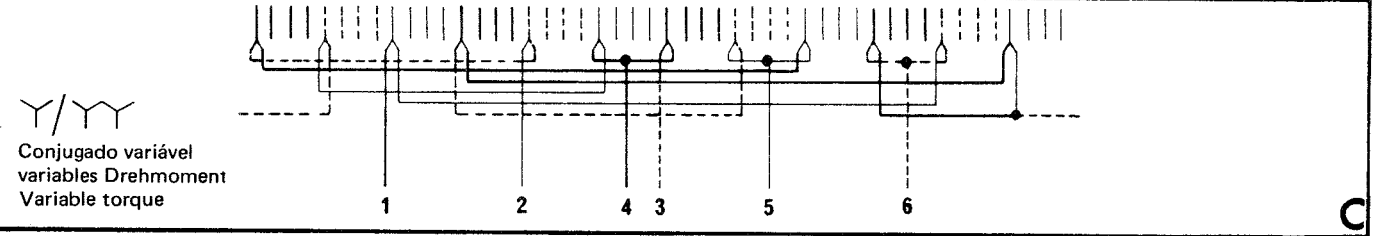
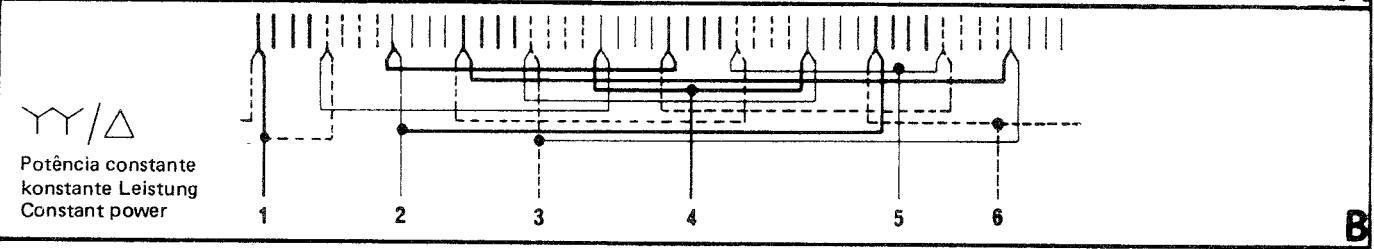
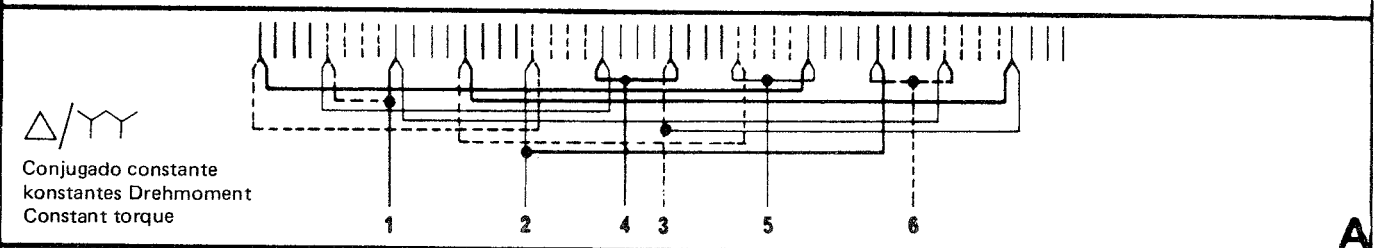
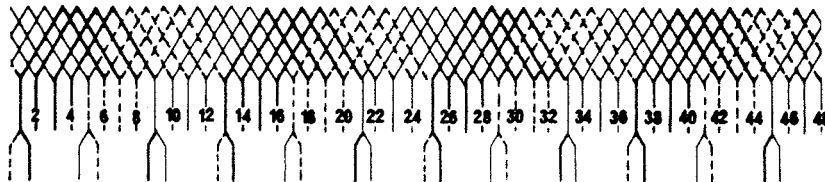
F

48 - 84 - 06/1  
(48-084-06/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	48 RANHURAS	8/4 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:6
DREHSTROM	48 NUTEN	8/4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SERIE	WICKEL-SCHRITT 1:6
THREE-PHASE	48 SLOTS	8/4 POLES	TWO LAYER	SERIES LAP	PITCH 1:6



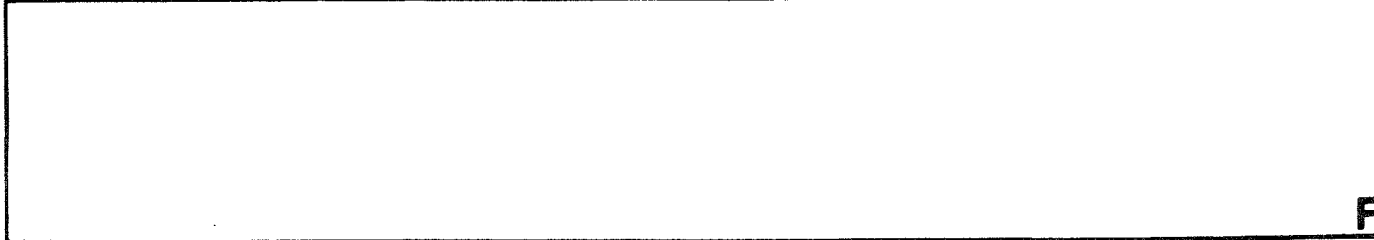
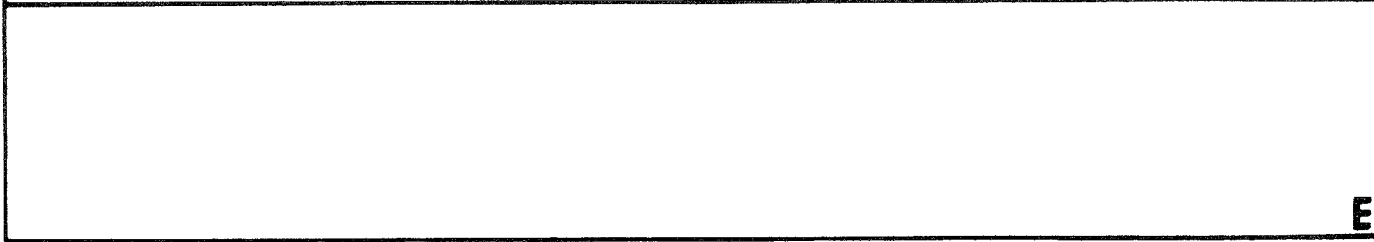
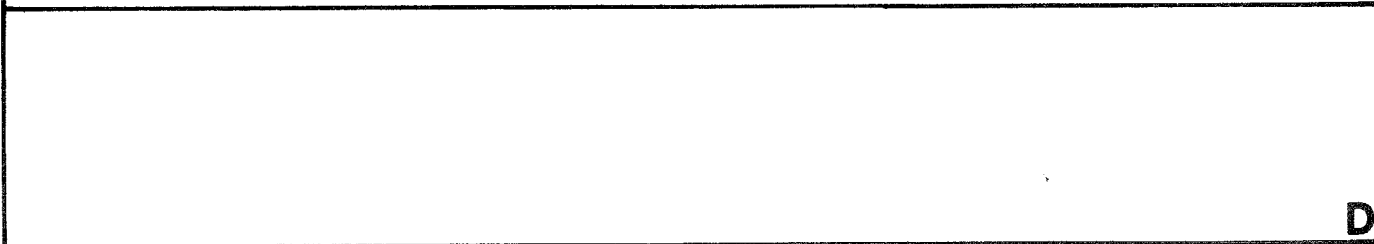
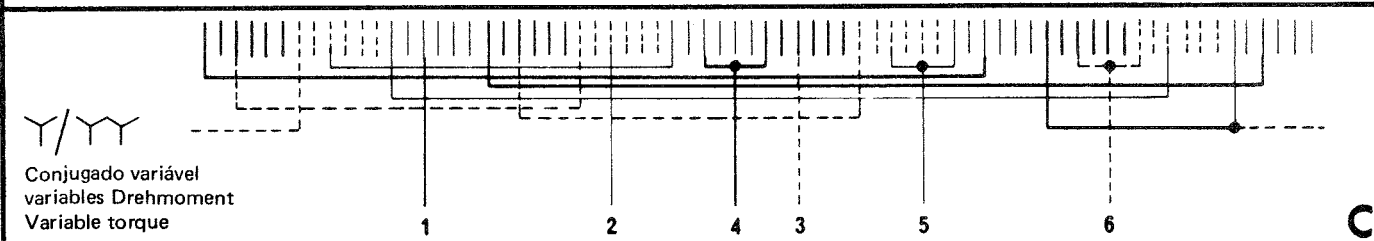
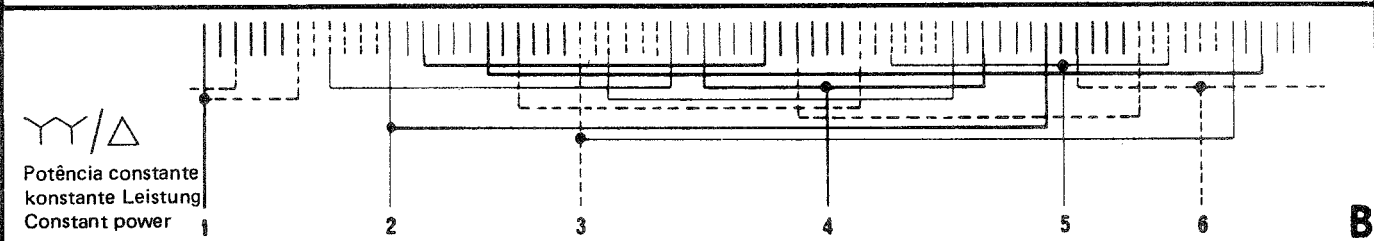
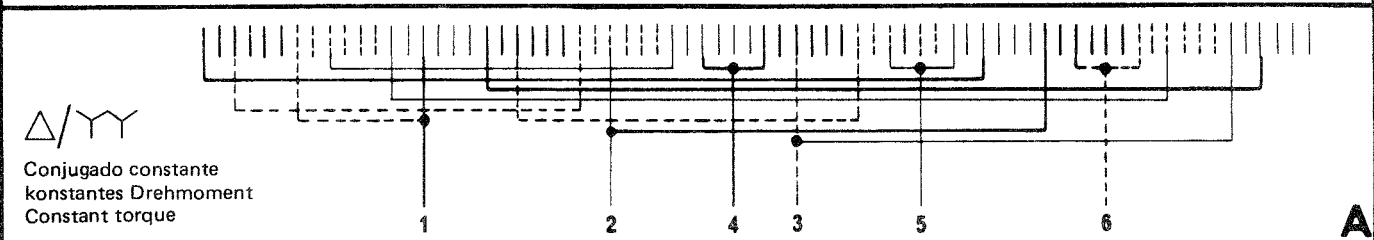
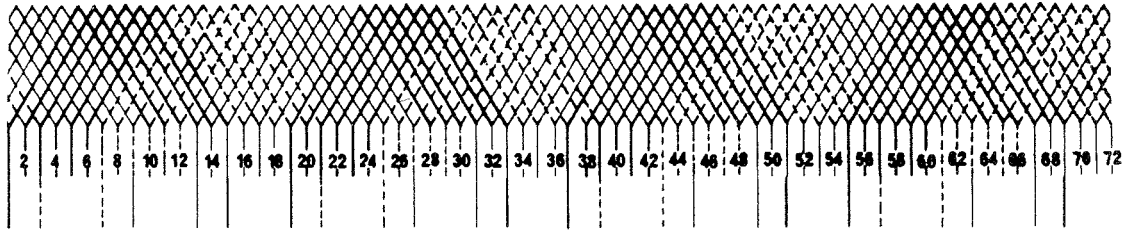
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 84 - 10/1  
(72-084-10/122-N)\*

TRIFÁSICO	72 RANHURAS	8/4 POLOS	CAMADA DUPLA	IMBRICADO SÉRIE	PASSO 1:10
DREHSTROM	72 NUTEN	8/4 POLE	DOPPEL-SCHICHT	TRÄUFEL-WICKLUNG SÉRIE	WICKEL-SCHRITT 1:10
THREE-PHASE	72 SLOTS	8/4 POLES	TWO LAYER	SERIES LAP	PITCH 1:10

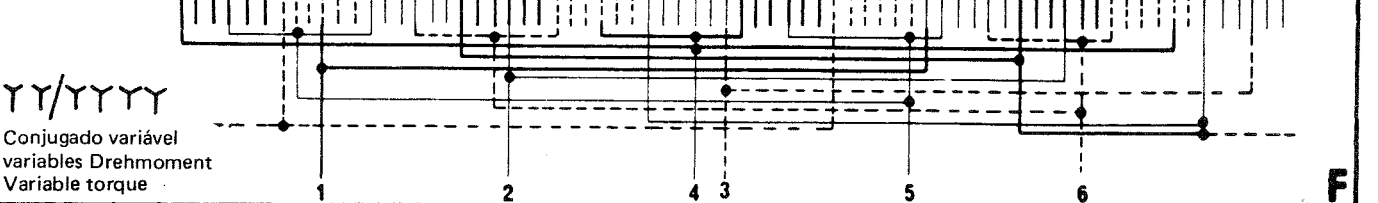
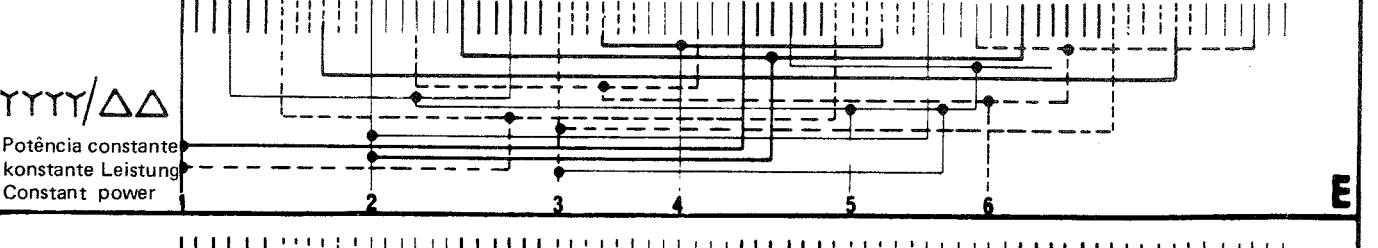
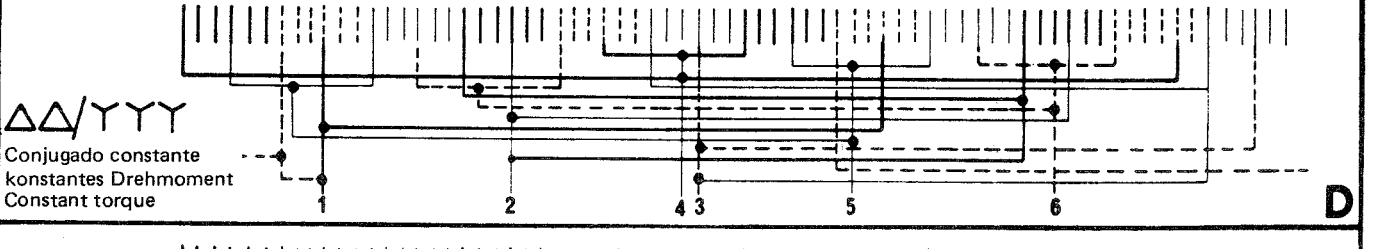
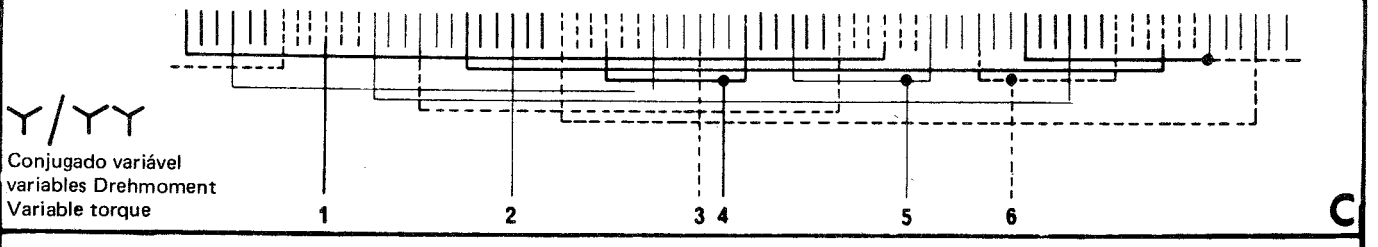
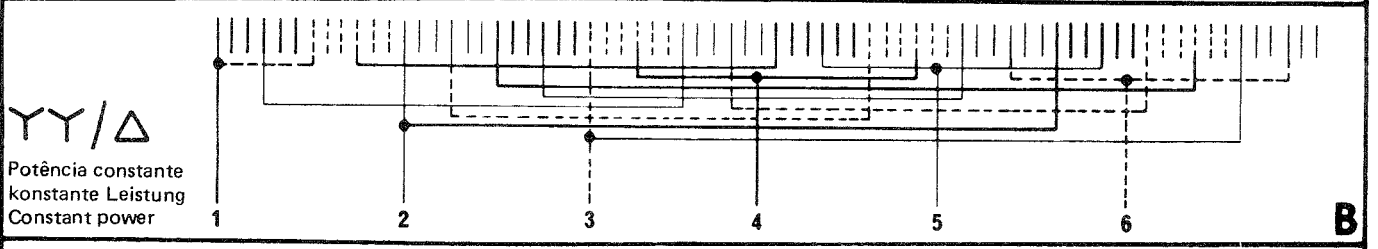
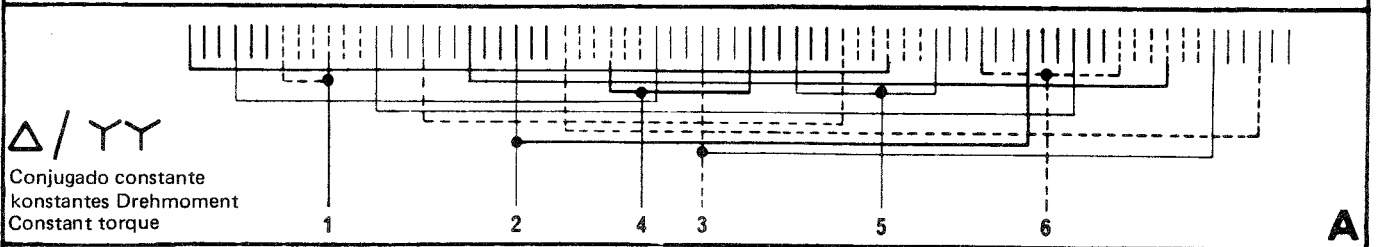
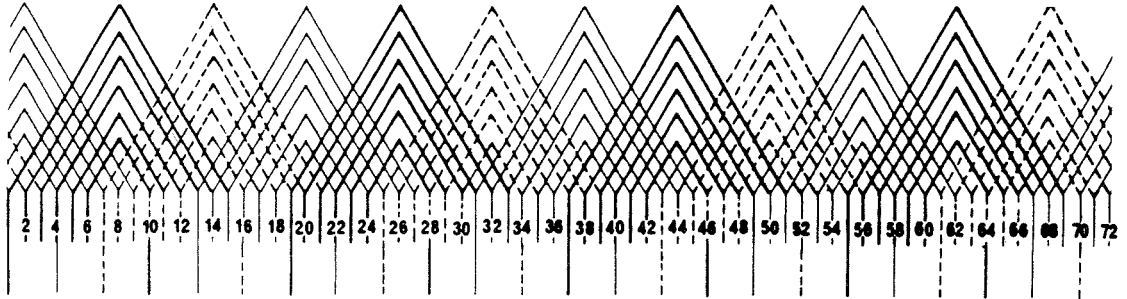


72 - 84 - 10/2  
(72-084-10/121-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO	72 RANHURAS	8/4 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:5:7:9:11: :13:15
DREHSTROM	72 NUTEN	8/4 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT :11:13:15
THREE-PHASE	72 SLOTS	8/4 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:5:7:9:11: :13:15



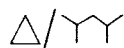
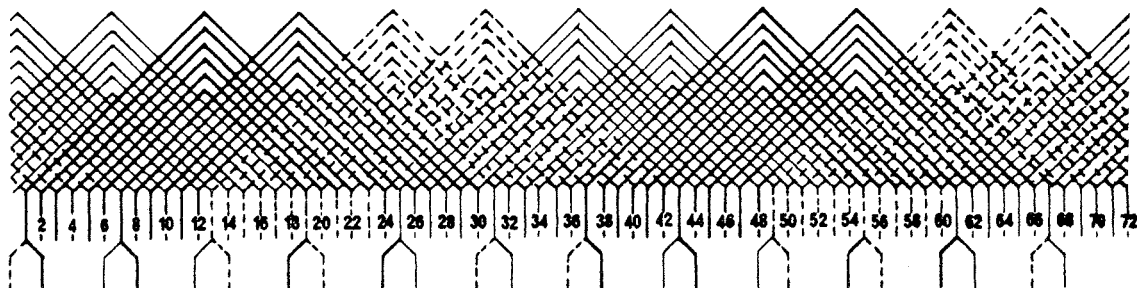
\*Nova nomenclatura



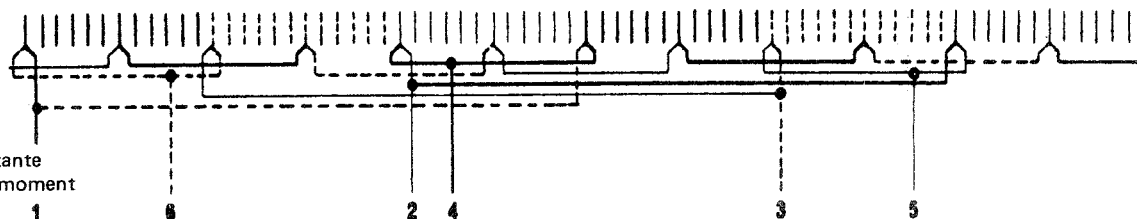
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 42 - 19/1  
(72-042-19/121-N)\*<sup>†</sup>

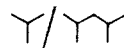
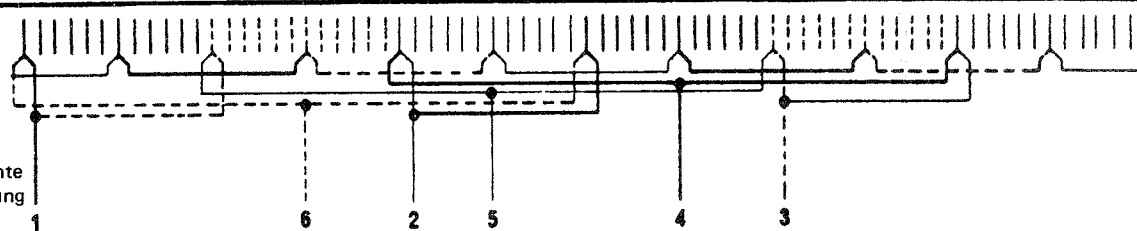
TRIFÁSICO	72 RANHURAS	4/2 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:14:16:18: :20:22:24
DREHSTROM	72 NUTEN	4/2 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL- 1:14:16:18: SCHRITT :20:22:24
THREE-PHASE	72 SLOTS	4/2 POLES	TWO LAYER	SERIES CONCENTRIC	PITCH 1:14:16:18: :20:22:24



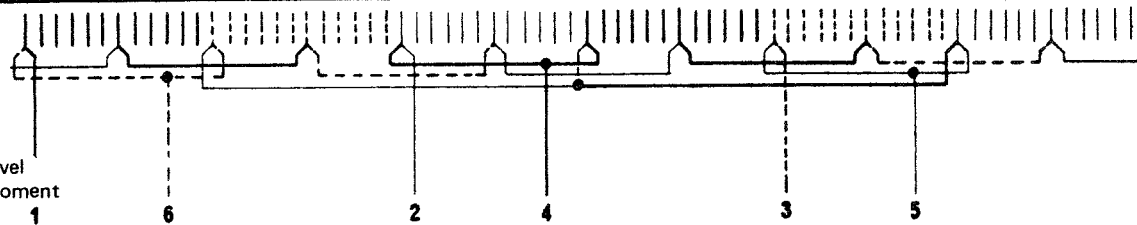
Conjugado constante  
konstantes Drehmoment  
Constant torque



Potência constante  
konstante Leistung  
Constant power



Conjugado variável  
variables Drehmoment  
Variable torque



A

B

C

D

E

F

72 - 126 - 07/1  
(72-126-07/122-N)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



TRIFÁSICO

72 RANHURAS

12/6 POLOS

CAMADA DUPLA

IMBRICADO SÉRIE

PASSO 1:7

DREHSTROM

72 NUTEN

12/6 POLE

DOPPEL-SCHICHT

TRÄUFEL-WICKLUNG SÉRIE

WICKEL-SCHRITT 1:7

THREE-PHASE

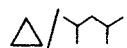
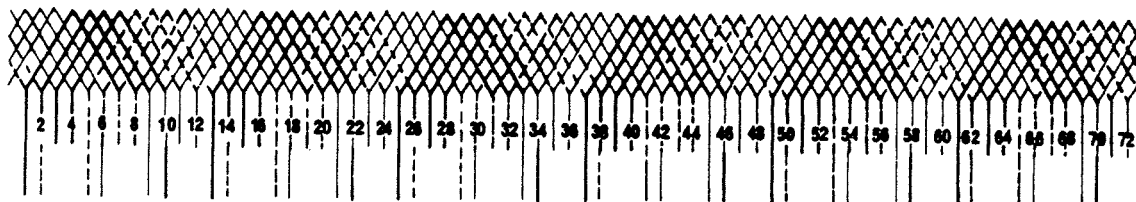
72 SLOTS

12/6 POLES

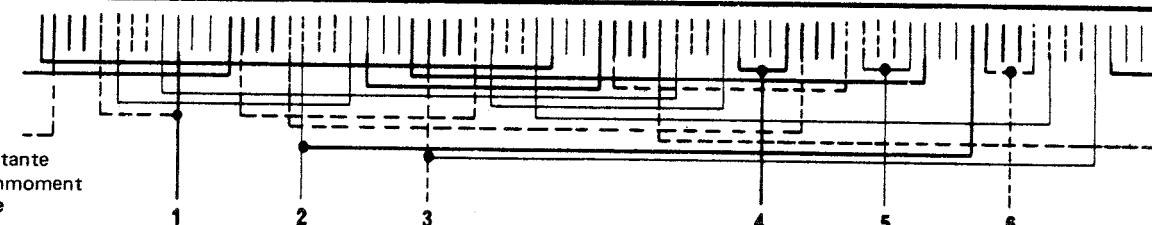
TWO LAYER

SERIES LAP

PITCH 1:7



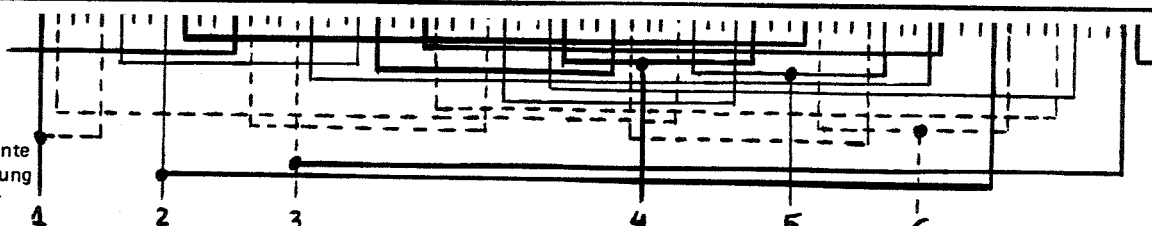
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



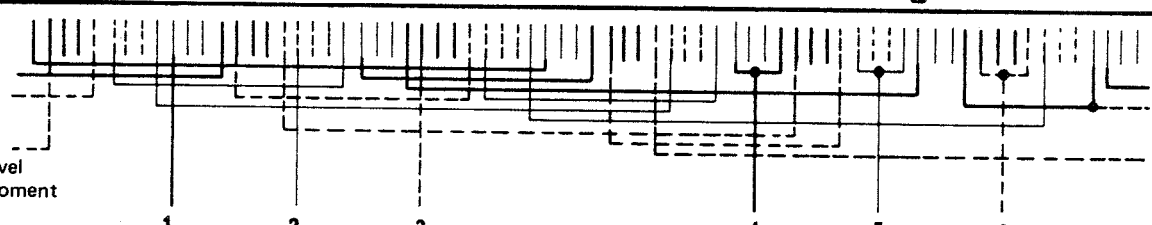
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

\*Nova nomenclatura

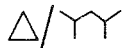
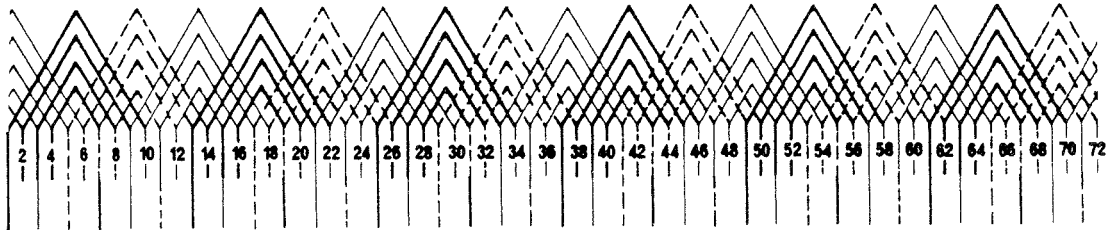




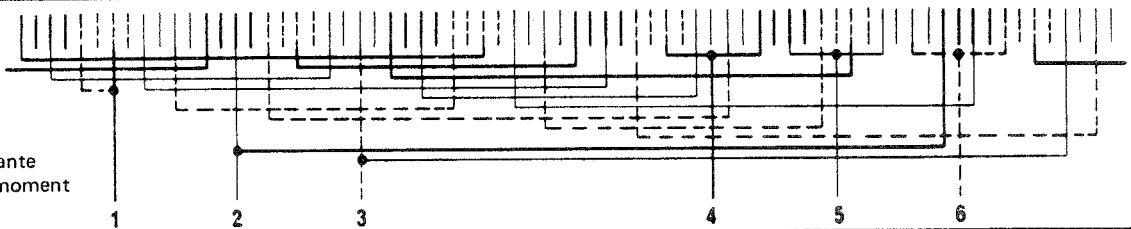
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

72 - 126 - 07/2  
(72-126-07/121-N)\*

TRIFÁSICO	72 RANHURAS	12/6 POLOS	CAMADA DUPLA	CONCÊNTRICO SÉRIE	PASSO 1:4:6:8:10
DREHSTROM	72 NUTEN	12/6 POLE	DOPPEL-SCHICHT	KONZENTRISCHE SÉRIE	WICKEL-SCHRITT 1:4:6:8:10
THREE-PHASE	72 SLOTS	12/6 POLES	TWO LAYER	SÉRIE CONCÊNTRICO	PITCH 1:4:6:8:10



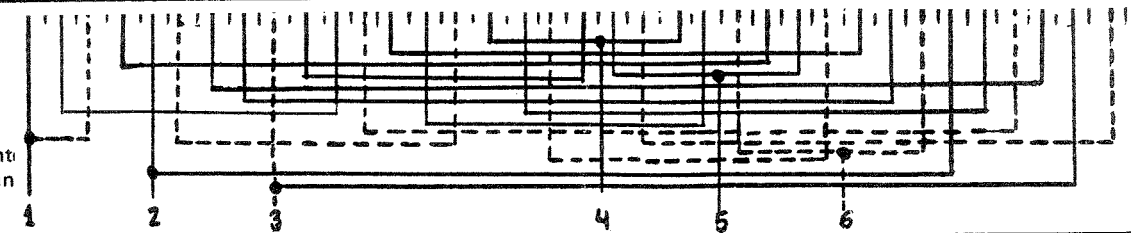
Conjugado constante  
konstantes Drehmoment  
Constant torque



A



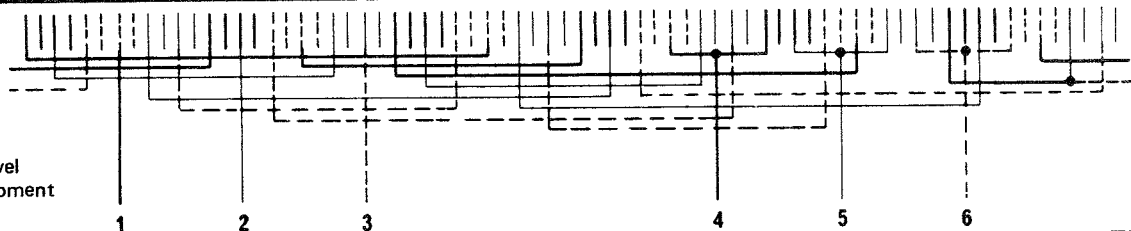
Potência constante  
konstante Leistung  
Constant power



B



Conjugado variável  
variables Drehmoment  
Variable torque



C

D

E

F

**NOTAS:**

**BEMERKUNGEN:**

**NOTES:**

a) Durante o 1º semestre do ano 2000, houve a alteração da identificação numérica dos cabos de alimentação dos motores **monofásicos**.

a) Die Numerierung der Anschlusskabel der **einphasigen Motoren** wurde im ersten Semester/2000 geändert.

a) The lead numbering (identification) of the **single-phase** motors has been changed during the first semester/2000.

Segue abaixo a tabela de equivalência:

Siehe unten Tabelle der Gleichwertigkeit:

For equivalence see Table below:

Identificação atual Neue Numerierung Current Numbering	Identificação antiga Alte Numerierung Old Numbering
1	1
2	3
3	2
4	4
5	5
8	6

b) Segue abaixo a tabela de equivalência para a identificação dos cabos de alimentação dos motores **trifásicos** de acordo com alguns mercados:

b) Siehe unten Tabelle zur Identifikation der Anschlusskabel von **Drestrommotoren**, die in einigen Ländern eingesetzt werden:

b) Please find below equivalence table for **three-phase** motor lead identification used on some markets:

Identificação atual Neue Numerierung Current Numbering	Identificação antiga Alte Numerierung Old Numbering
1U	1
1V	2
1W	3
2U	4
2V	5
2W	6
3U	7
3V	8
3W	9
4U	10
4V	11
4W	12

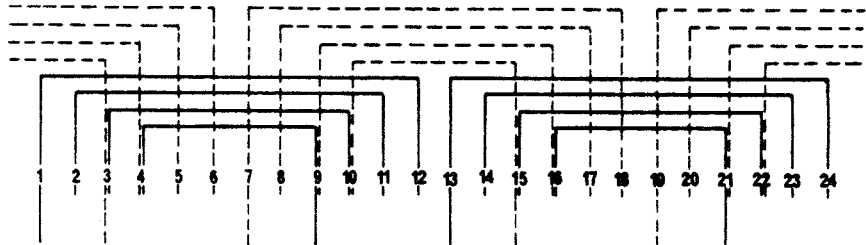


24 - 02 - 09/1  
(24-02-09-09/11-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	24 RANHURAS	2 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:6:8:10:12 1:6:8:10:12
EINPHASEN	24 NUTEN	2 POLE	EINZEL-SCHICHT	SERIE	WICKEL- 1:6:8:10:12 SCHRITT 1:6:8:10:12
SINGLE-PHASE	24 SLOTS	2 POLES	SINGLE LAYER	SERIES	PITCH 1:6:8:10:12 1:6:8:10:12



Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads

**A**

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads

**B**

Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads

**C**

Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads

**D**

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads

**E**

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads

**F**

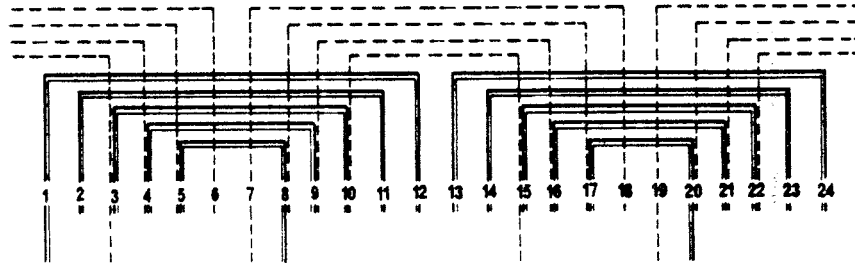
\*Nova nomenclatura



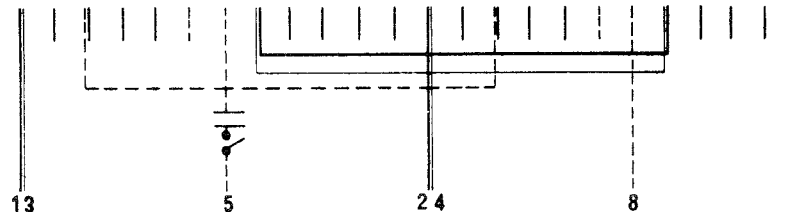
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

24 - 02 - 08/1  
(24-02-08-08/12-1)\*

MONOFÁSICO	24 RANHURAS	2 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:4:6:8:10:12 1:6:8:10:12
EINPHASEN	24 NUTEN	2 POLE	DOPPEL-SCHICHT	SERIE	WICKEL-1:4:6:8:10:12 SCHRITT 1:6:8:10:12
SINGLE-PHASE	24 SLOTS	2 POLES	TWO LAYER	SERIES	PITCH 1:4:6:8:10:12 1:6:8:10:12

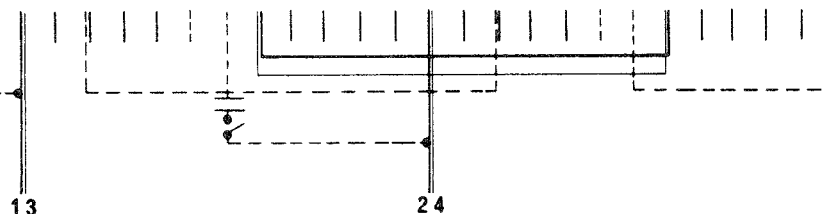


Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads



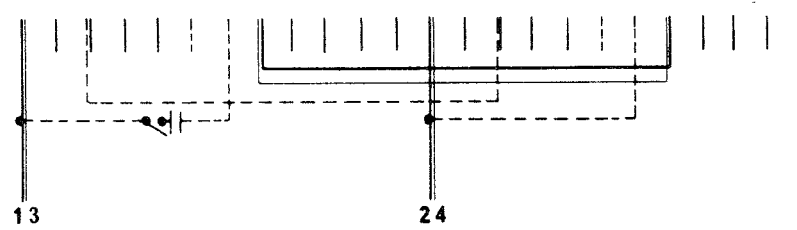
A

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads



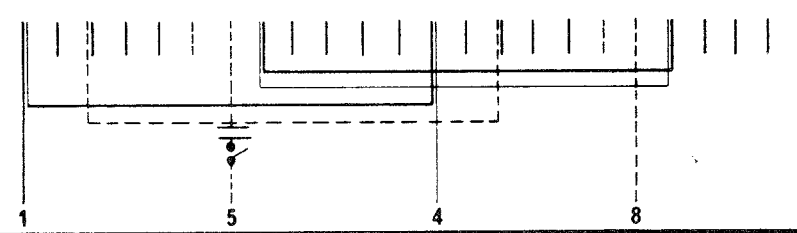
B

Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads



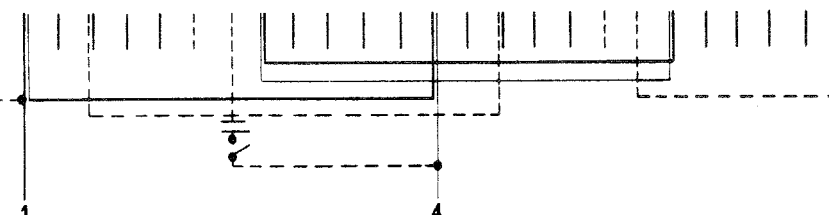
C

Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads



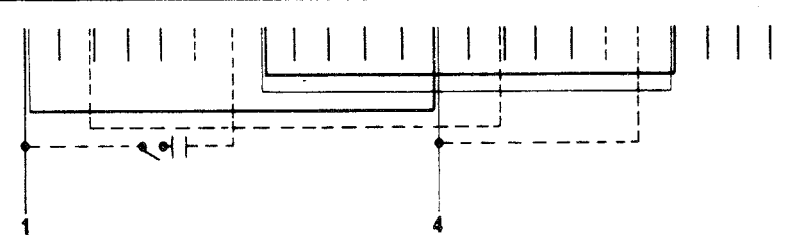
D

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads



E

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads



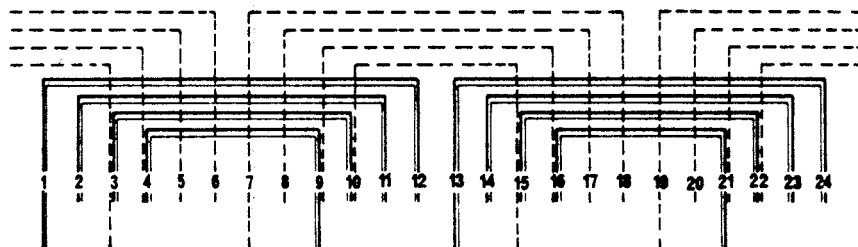
F

24 - 02 - 09/2  
(24-02-09-09/12-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	24 RANHURAS	2 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:6:8:10:12 1:6:8:10:12
EINPHASEN	24 NUTEN	2 POLE	DOPPEL-SCHICHT	SERIE	WICKEL-SCHRITT 1:6:8:10:12 1:6:8:10:12
SINGLE-PHASE	24 SLOTS	2 POLES	TWO LAYER	SERIES	PITCH 1:6:8:10:12 1:6:8:10:12



Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads

**A**

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads

**B**

Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads

**C**

Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads

**D**

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads

**E**

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads

**F**

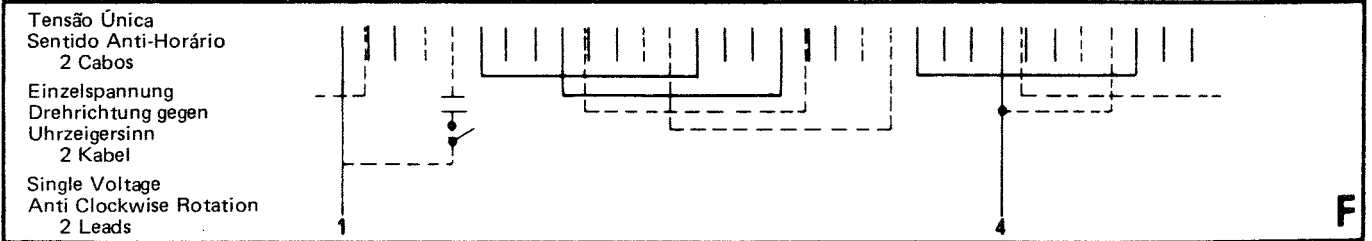
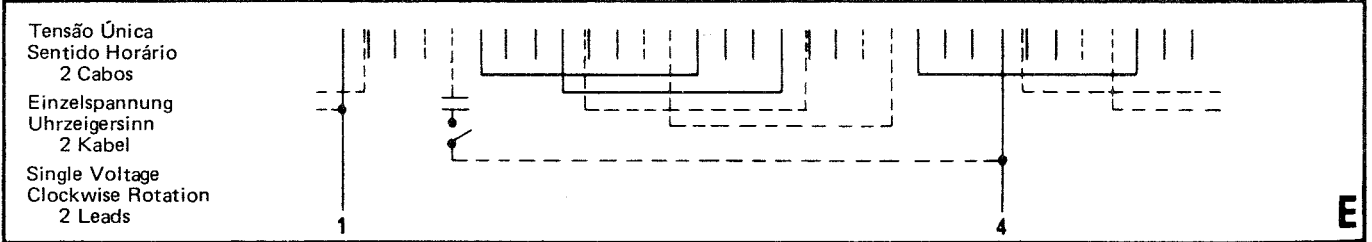
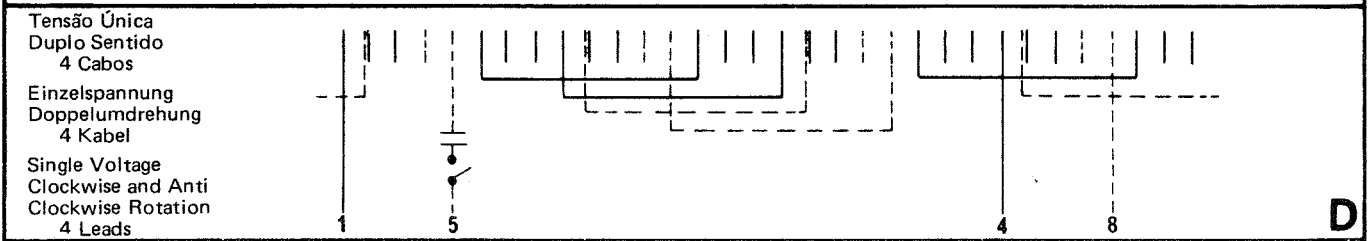
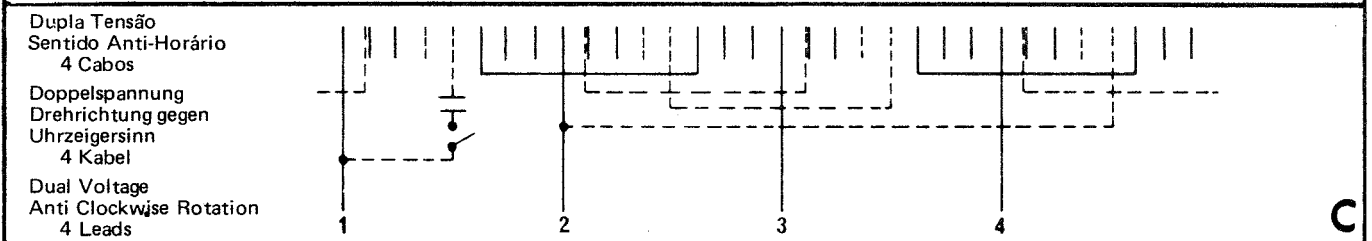
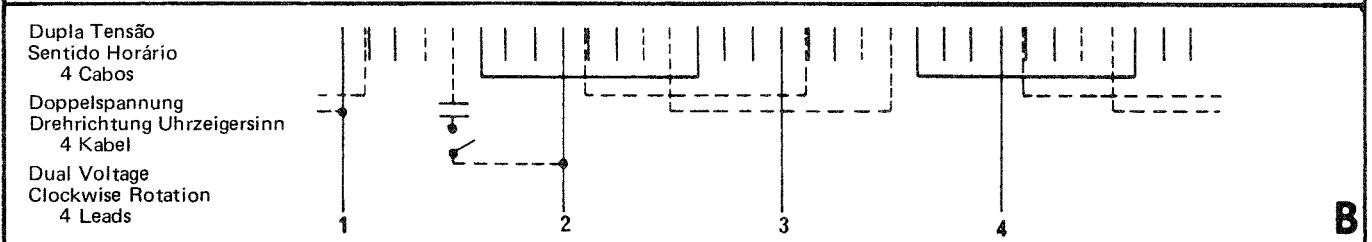
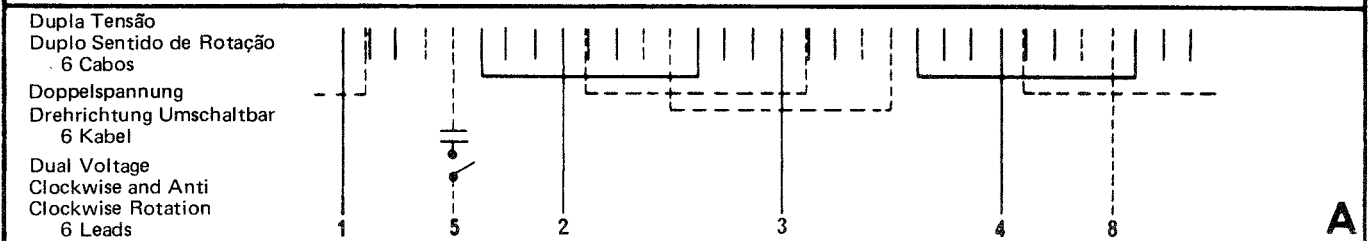
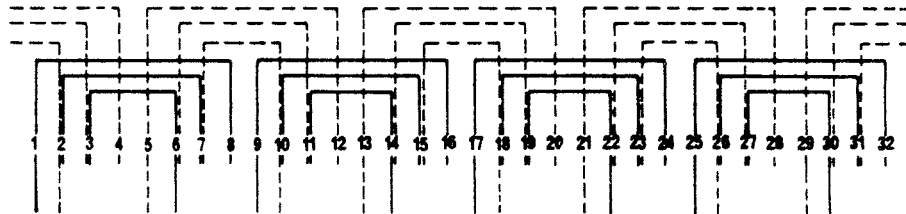
\*Nova nomenclatura



ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

32 - 04 - 06/1  
(32-04-06-06/11-1)\*

MONOFÁSICO	32 RANHURAS	4 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:4:6:8 1:4:6:8
EINPHASEN	32 NUTEN	4 POLE	EINZEL-SCHICHT	SERIE	WICKEL-SCHRITT 1:4:6:8 1:4:6:8
SINGLE-PHASE	32 SLOTS	4 POLES	SINGLE LAYER	SERIES	PITCH 1:4:6:8 1:4:6:8

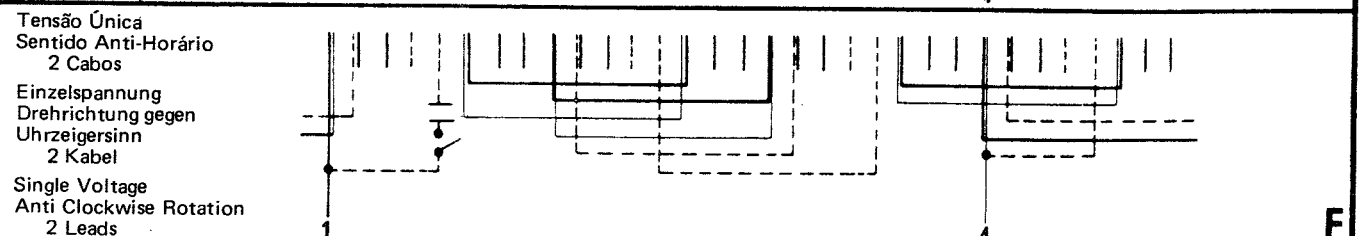
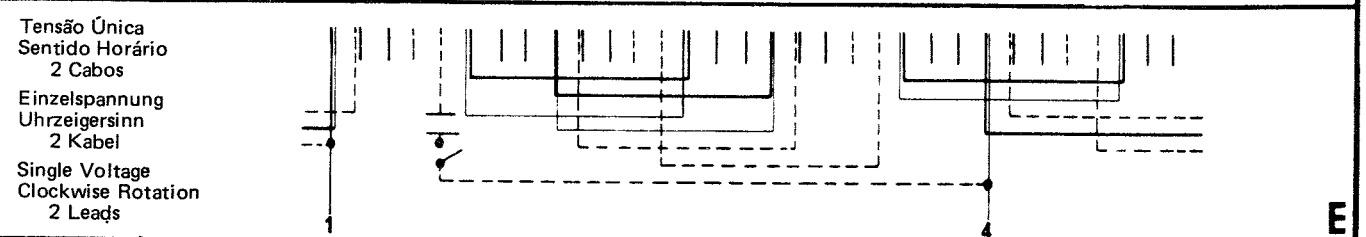
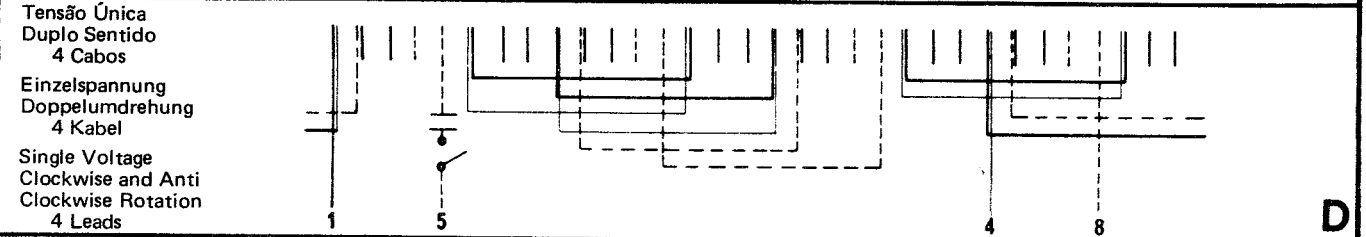
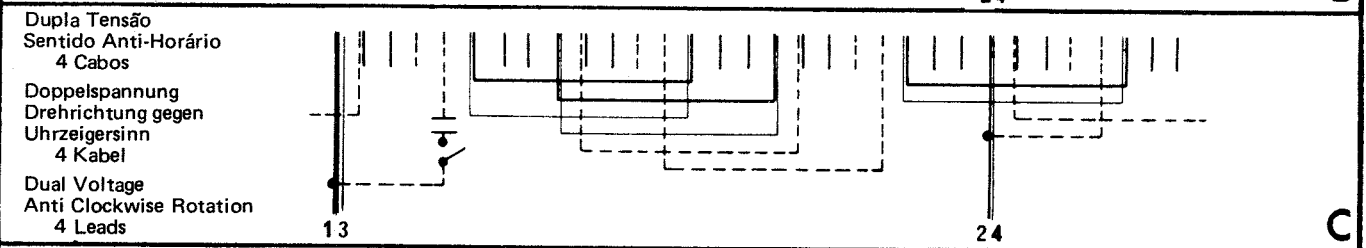
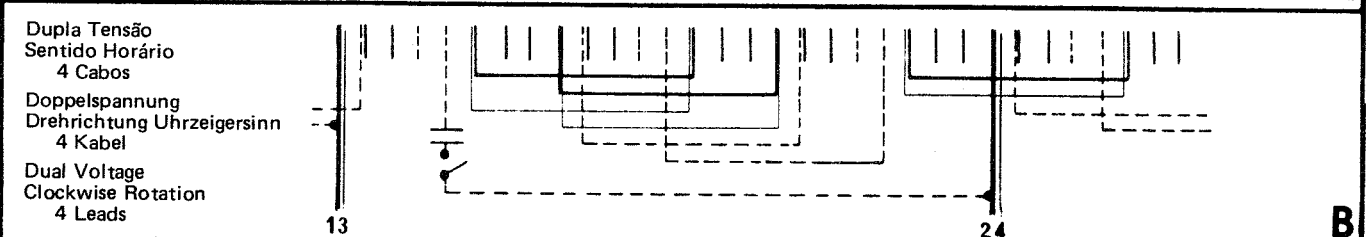
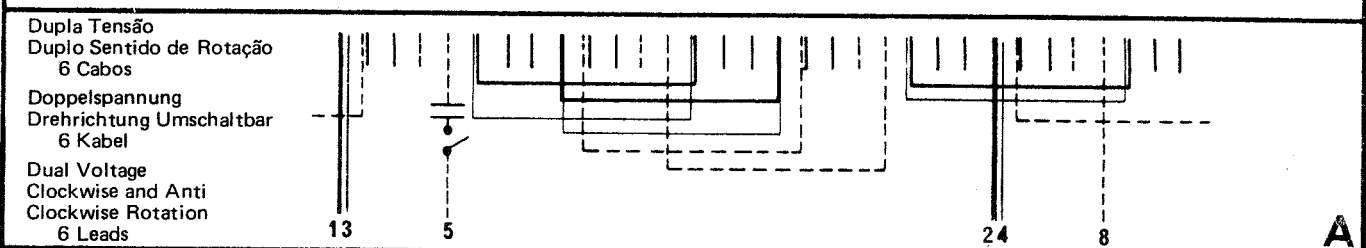
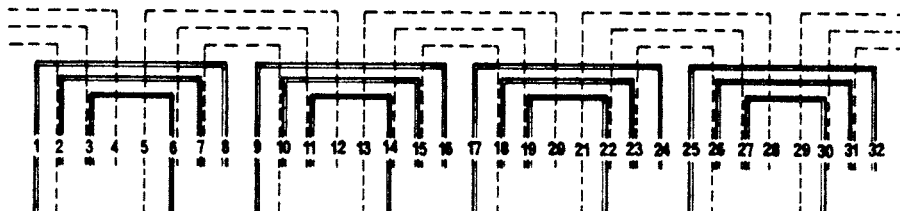


32 - 04 - 06/2  
(32-04-06-06/12-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	32 RANHURAS	4 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:4:6:8 1:4:6:8
EINPHASEN	32 NUTEN	4 POLE	DOPPEL-SCHICHT	SERIE	WICKEL-SCHRITT 1:4:6:8 1:4:6:8
SINGLE-PHASE	32 SLOTS	4 POLES	TWO LAYER	SERIES	PITCH 1:4:6:8 1:4:6:8



\*Nova nomenclatura

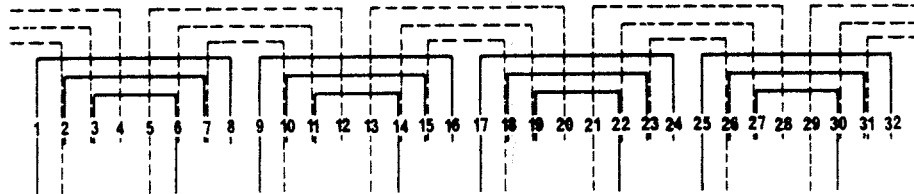




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

32-04-06/3  
(32-04-06-06/21-1)\*

MONOFÁSICO	32 RANHURAS	4 POLOS	CAMADA ÚNICA	PARALELO	PASSO 1:4:6:8 1:4:6:8
EINPHASEN	32 NUTEN	4 POLE	EINZEL-SCHICHT	PARALLEL	WICKEL-SCHRITT 1:4:6:8 1:4:6:8
SINGLE-PHASE	32 SLOTS	4 POLES	SINGLE LAYER	PARALLEL	PITCH 1:4:6:8 1:4:6:8



Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads

A

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads

B

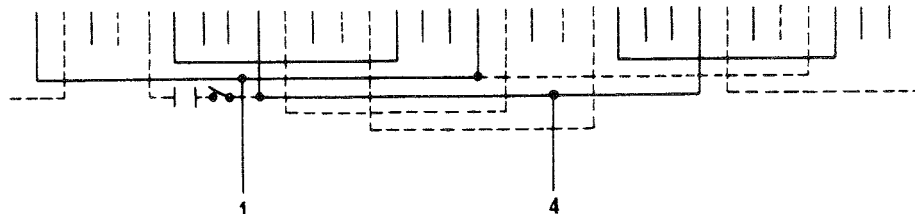
Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads

C

Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads

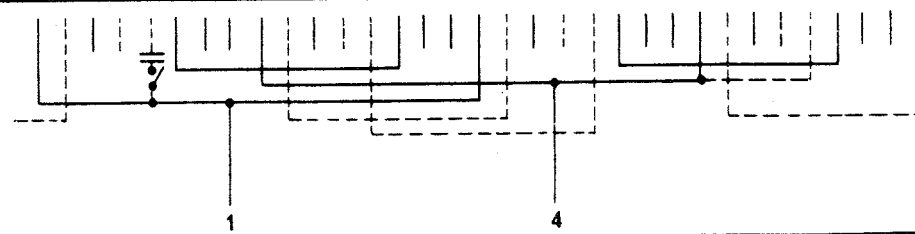
D

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads


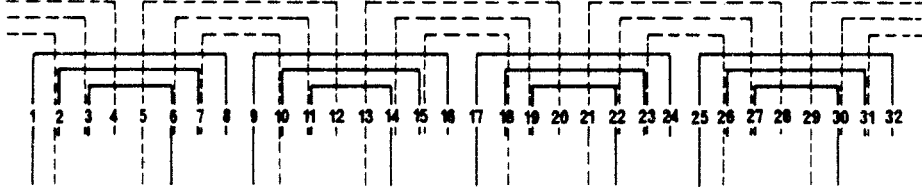
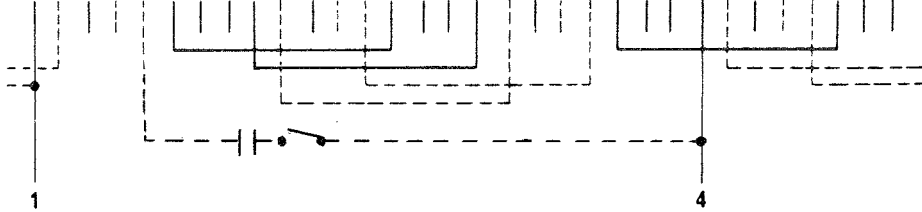
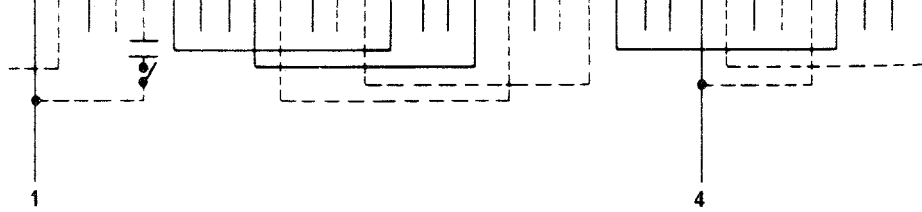


E

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads



F

32 - 04 - 06/4 (32-04-06-06/11-1)*	ESQUEMAS DE BOBINAGEM WICKELSCHEMEN WINDING DIAGRAMS				
MONOFÁSICO  EINPHASEN  SINGLE-PHASE	32 RANHURAS  32 NUTEN  32 SLOTS	4 POLOS  4 POLE  4 POLES	CAMADA ÚNICA  EINZEL-SCHICHT  SINGLE LAYER	SÉRIE  SERIE  SERIES	PASSO 1:4:6:8 1:4:6:8  WICKEL- 1:4:6:8 SCHRITT 1:4:6:8  PITCH 1:4:6:8 1:4:6:8
					
<p>           Dupla Tensão            Duplo Sentido de Rotação            6 Cabos            Doppelspannung            Drehrichtung Umschaltbar            6 Kabel            Dual Voltage            Clockwise and Anti            Clockwise Rotation            6 Leads         </p> <p style="text-align: right;"><b>A</b></p>					
<p>           Dupla Tensão            Sentido Horário            4 Cabos            Doppelspannung            Drehrichtung Uhrzeigersinn            4 Kabel            Dual Voltage            Clockwise Rotation            4 Leads         </p> <p style="text-align: right;"><b>B</b></p>					
<p>           Dupla Tensão            Sentido Anti-Horário            4 Cabos            Doppelspannung            Drehrichtung gegen            Uhrzeigersinn            4 Kabel            Dual Voltage            Anti Clockwise Rotation            4 Leads         </p> <p style="text-align: right;"><b>C</b></p>					
<p>           Tensão Única            Duplo Sentido            4 Cabos            Einzelspannung            Doppelumdrehung            4 Kabel            Single Voltage            Clockwise and Anti            Clockwise Rotation            4 Leads         </p> <p style="text-align: right;"><b>D</b></p>					
<p>           Tensão Única            Sentido Horário            2 Cabos            Einzelspannung            Uhrzeigersinn            2 Kabel            Single Voltage            Clockwise Rotation            2 Leads         </p> <p style="text-align: right;"><b>E</b></p> 					
<p>           Tensão Única            Sentido Anti-Horário            2 Cabos            Einzelspannung            Drehrichtung gegen            Uhrzeigersinn            2 Kabel            Single Voltage            Anti Clockwise Rotation            2 Leads         </p> <p style="text-align: right;"><b>F</b></p> 					

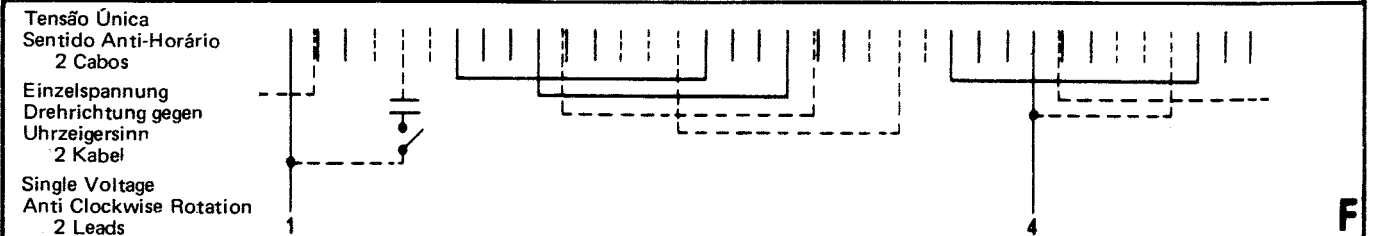
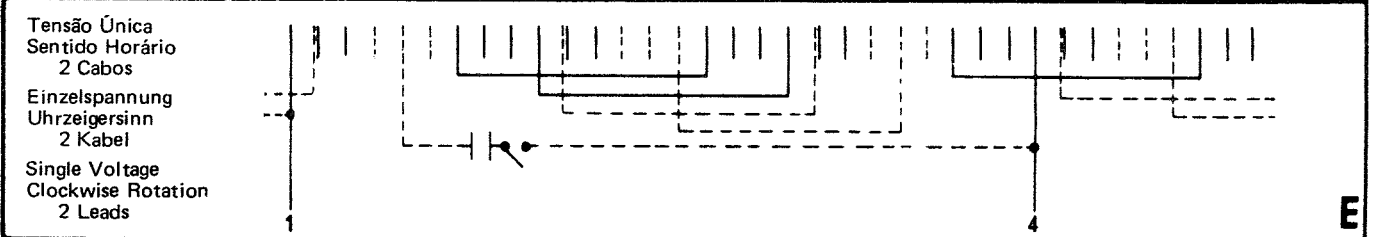
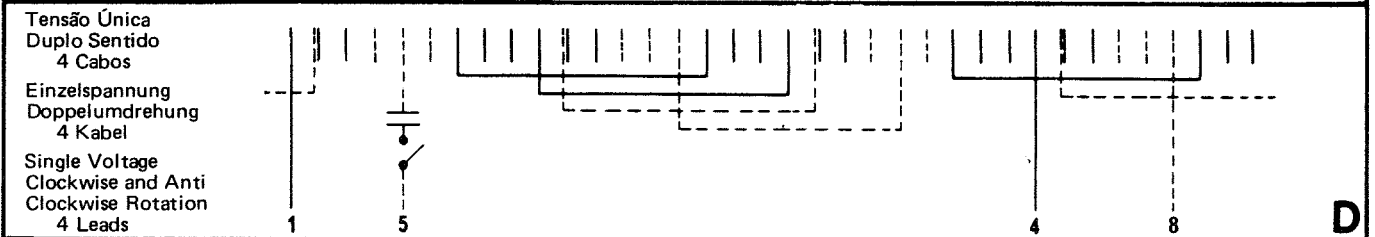
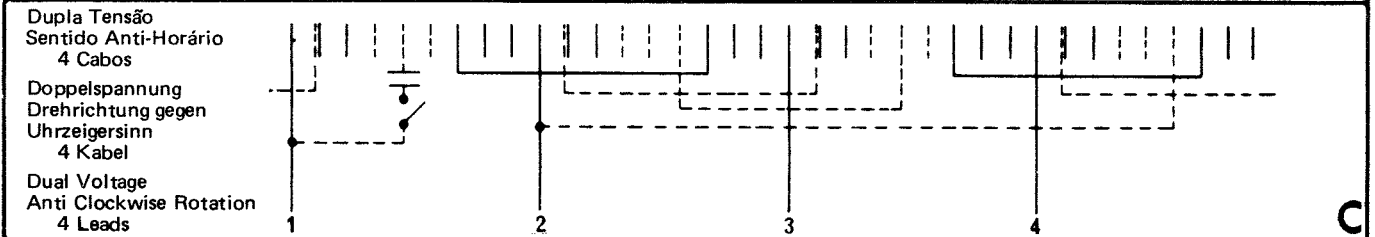
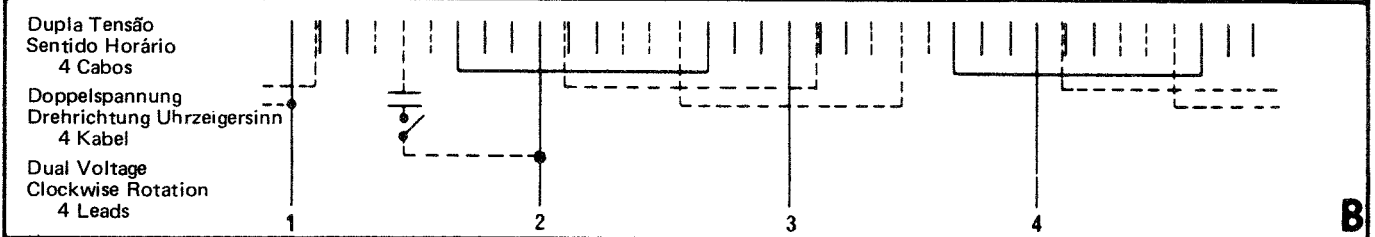
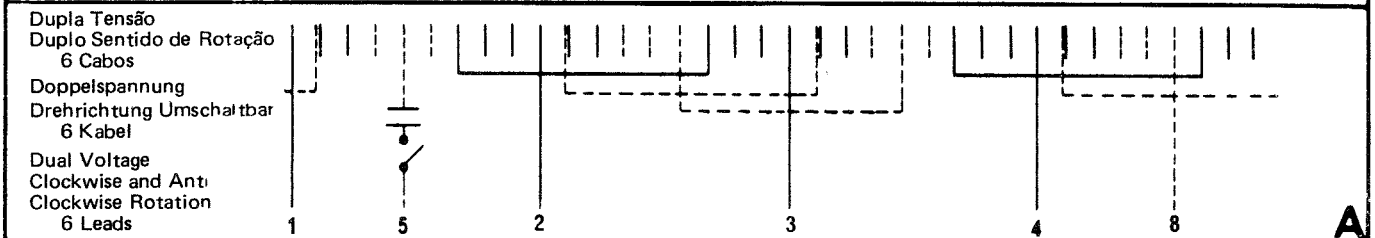
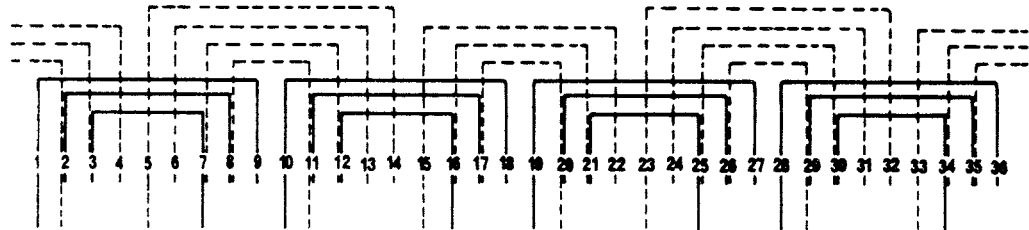
\*Nova nomenclatura



**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

36 - 04 - 07/1  
(36-04-07-07/11-1)\*

MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:5:7:9 1:4:6:8:10
EINPHASEN	36 NUTEN	4 POLE	EINZEL-SCHICHT	SERIE	WICKEL- 1:5:7:9 SCHRIITT 1:4:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	SINGLE LAYER	SERIES	PITCH 1:5:7:9 1:4:6:8:10

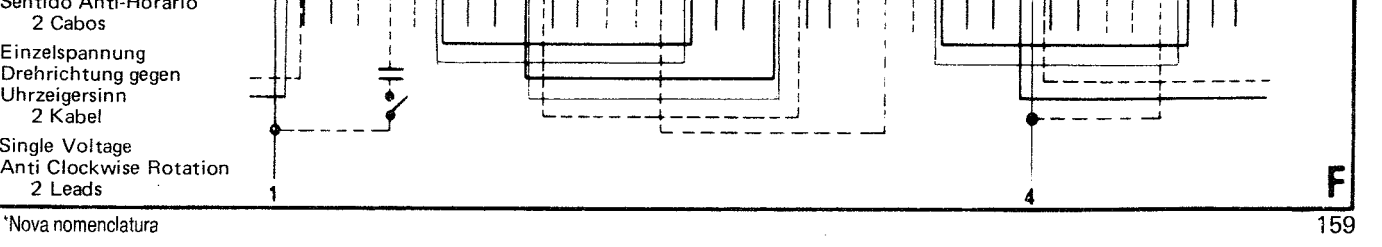
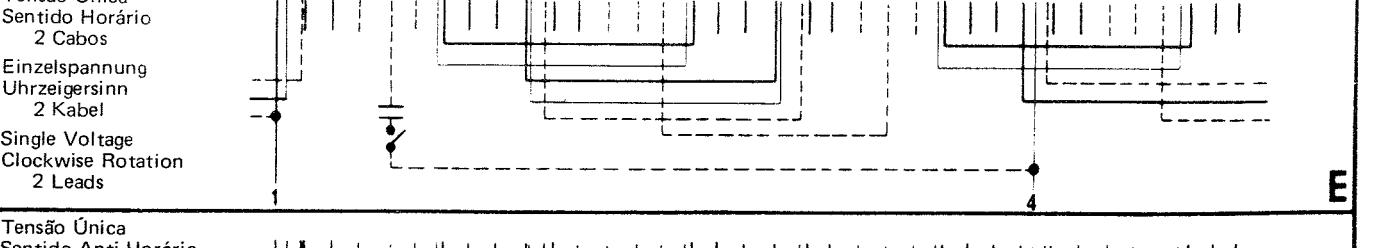
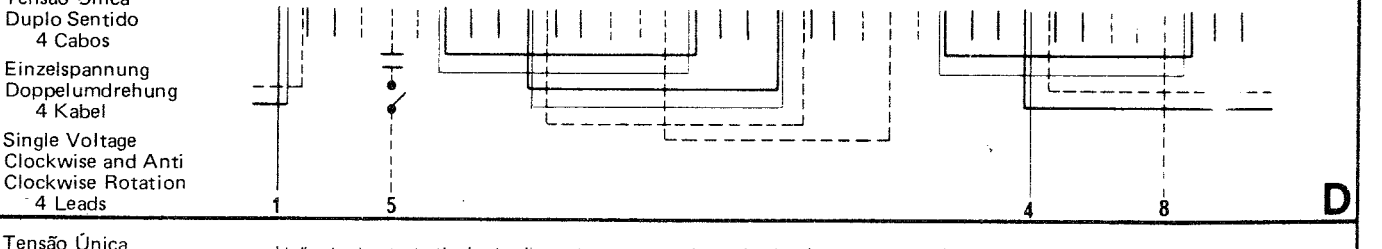
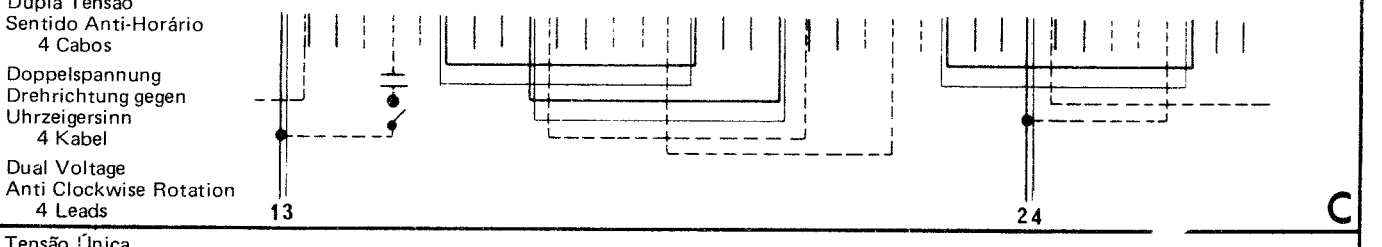
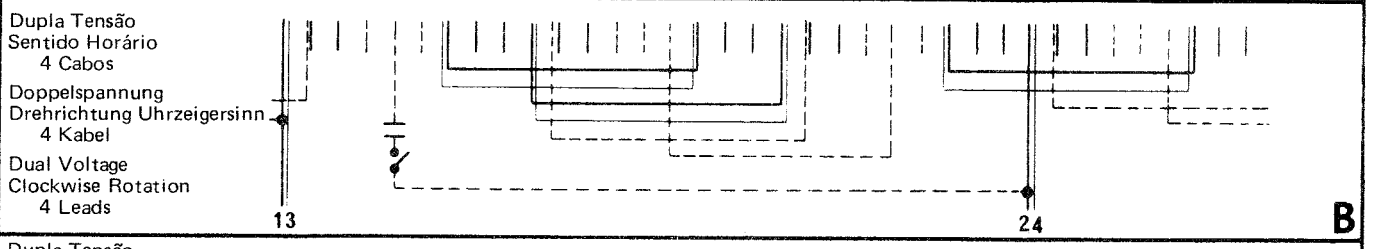
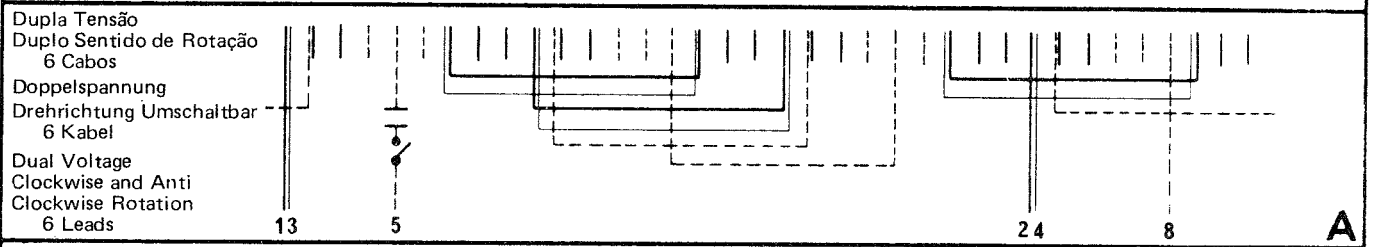
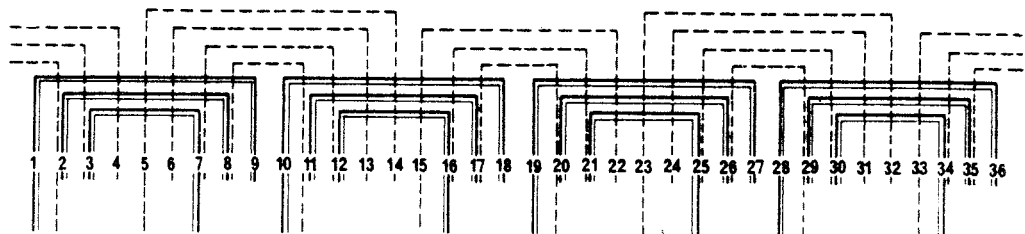


36 - 04 - 07/2  
(36-04-07-07/12-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:5:7:9 1:4:6:8:10
EINPHASEN	36 NUTEN	4 POLE	DOPPEL-SCHICHT	SERIE	WICKEL- 1:5:7:9 SCHRITT 1:4:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	TWO LAYER	SERIES	PITCH 1:5:7:9 1:4:6:8:10



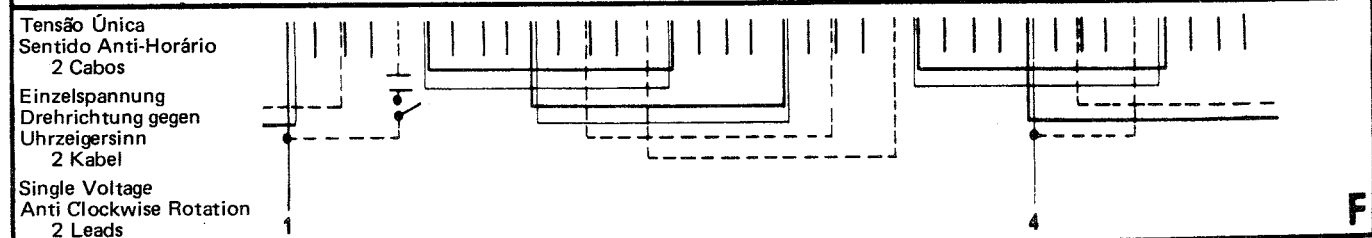
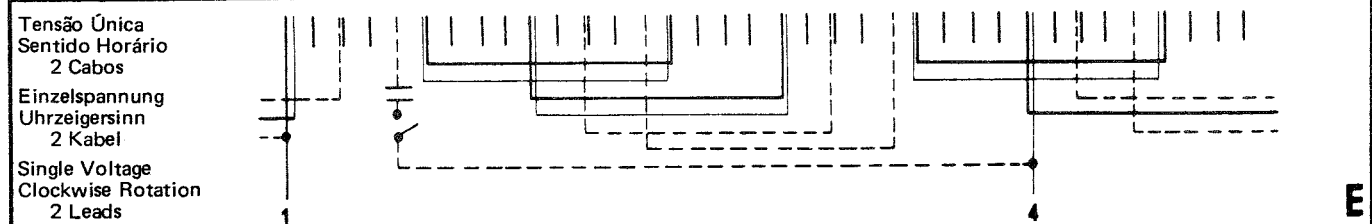
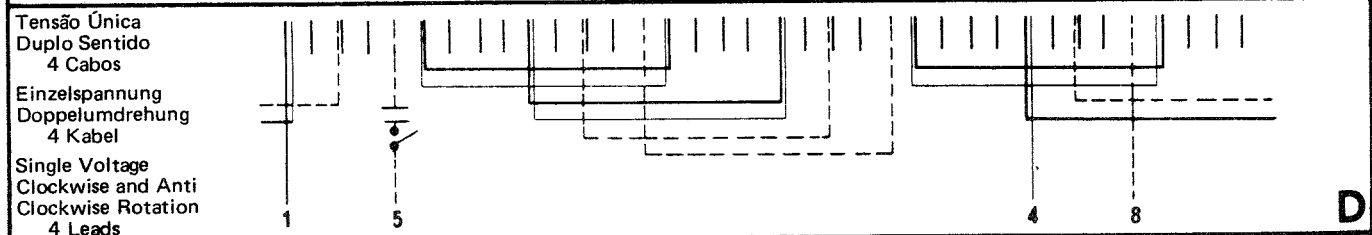
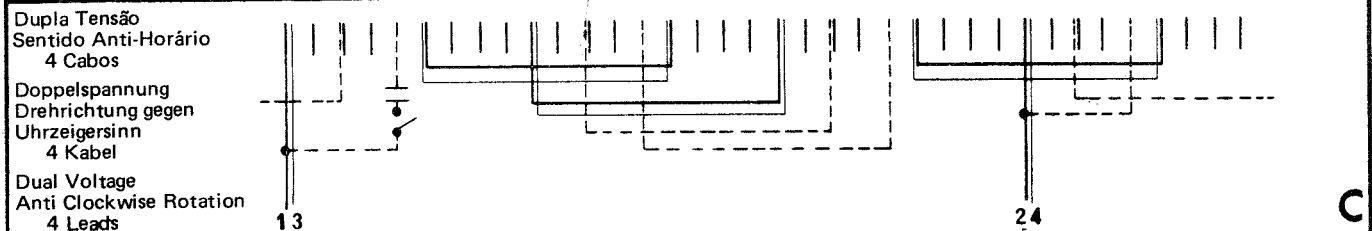
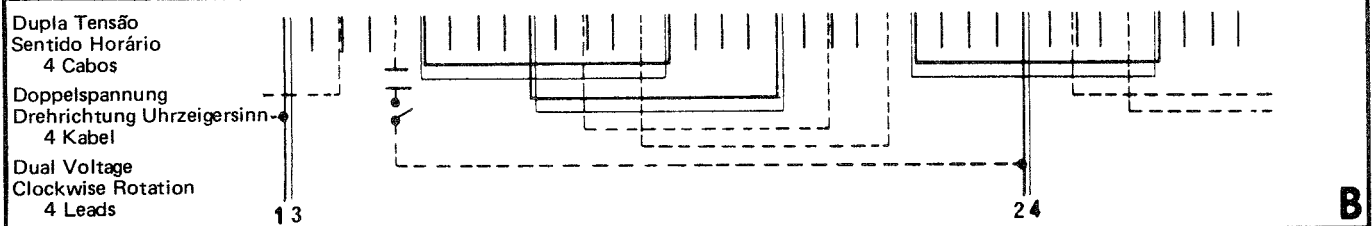
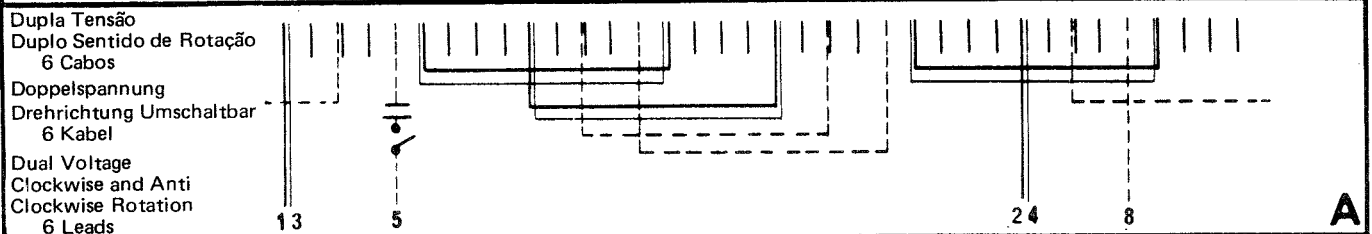
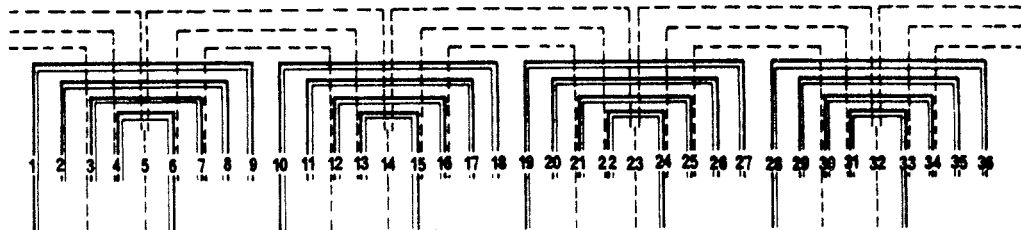
\*Nova nomenclatura



**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

36 - 04 - 06/1  
(36-04-06-08/12-1)\*

MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:3:5:7:9 1:6:8:10
EINPHASEN	36 NUTEN	4 POLE	DOPPEL-SCHICHT	SERIE	WICKEL- 1:3:5:7:9 SCHRITT 1:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	TWO LAYER	SERIES	PITCH 1:3:5:7:9 1:6:8:10

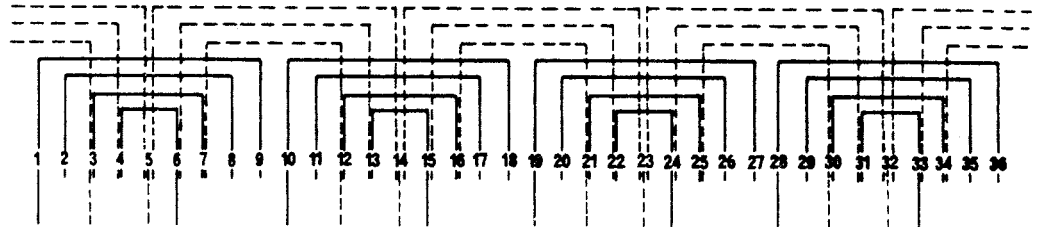


36 - 04 - 06/3  
(36-04-06-08/11-1)\*

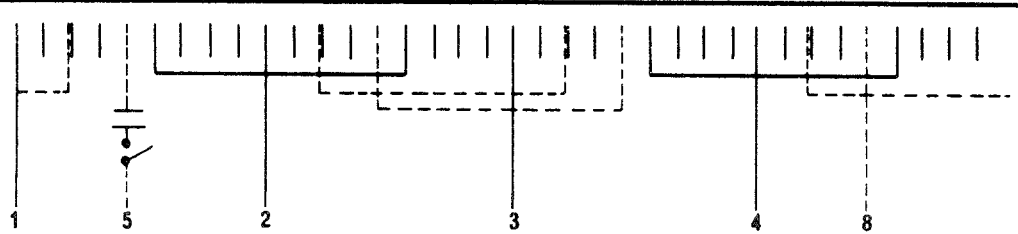
ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:3:5:7:9 1:6:8:10
EINPHASEN	36 NUTEN	4 POLE	EINZEL-SCHICHT	SERIE	WICKEL- 1:3:5:7:9 SCHRITT 1:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	TWO LAYER	SERIES	PITCH 1:3:5:7:9 1:6:8:10

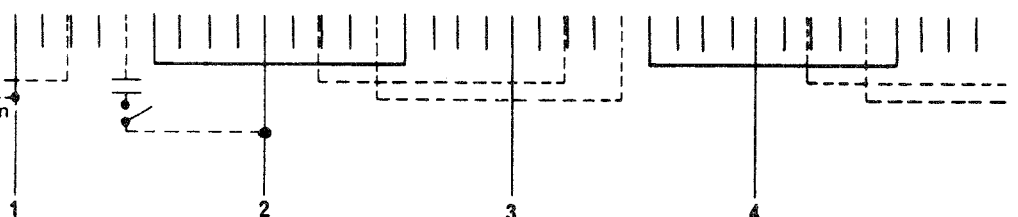


Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads



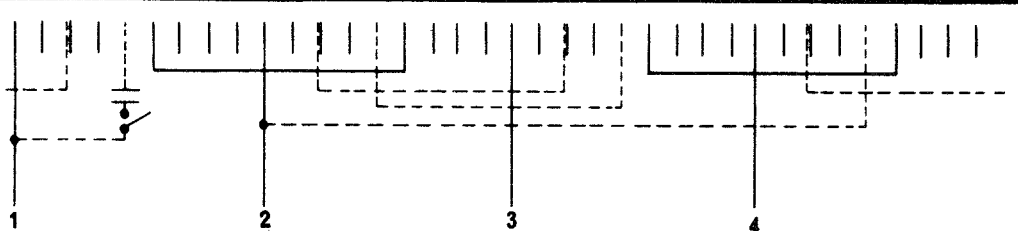
A

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads



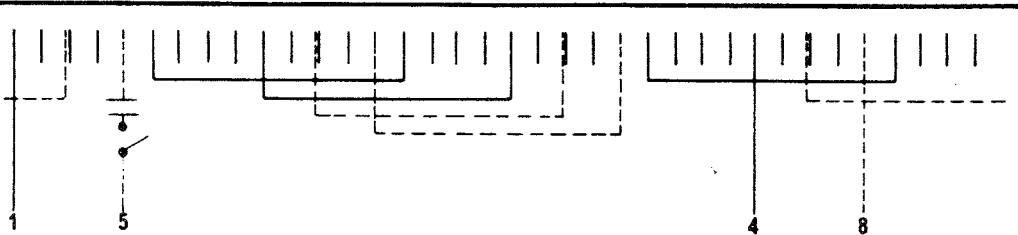
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Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads



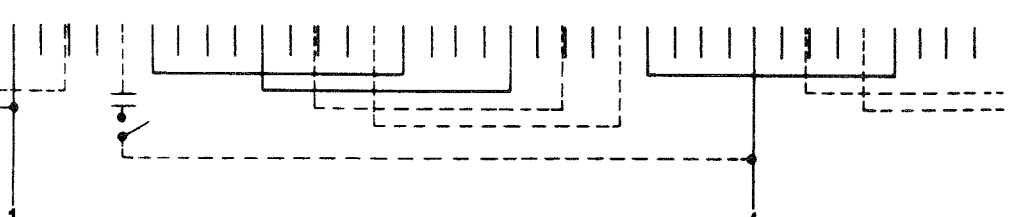
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Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads



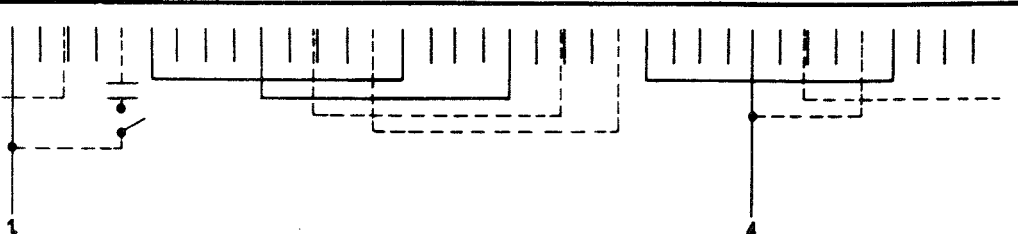
D

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads



E

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads



F

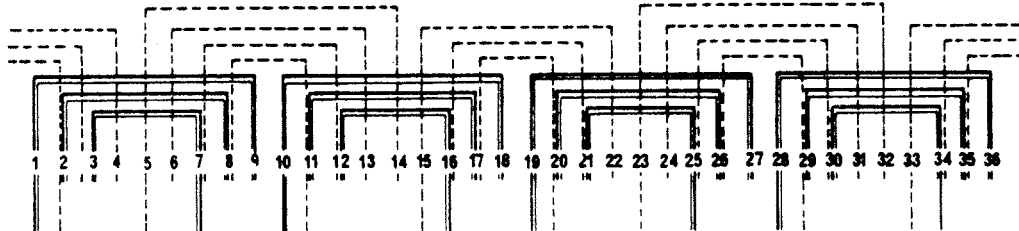
\*Nova nomenclatura



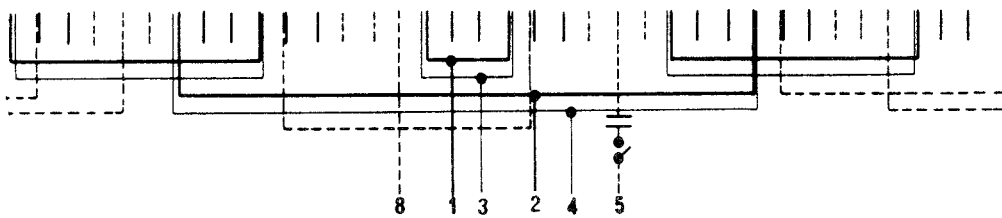
# ESQUEMAS DE BOBINAGEM WICKELSCHEMEN WINDING DIAGRAMS

36 - 04 - 07/3  
(36-04-07-07/22-1)\*

MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	PARALELO	PASSO 1:5:7:9 1:4:6:8:10
EINPHASEN	36 NUTEN	4 POLE	DOPPEL-SCHICHT	PARALLEL	WICKEL-SCHRITT 1:5:7:9 1:4:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	TWO LAYER	PARALLEL	PITCH 1:5:7:9 1:4:6:8:10

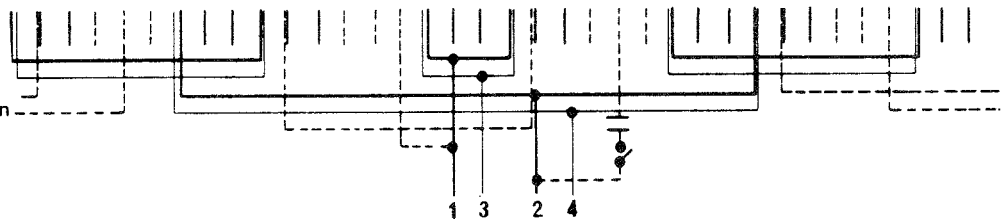


Dupla Tensão  
Duplo Sentido de Rotação  
6 Cabos  
Doppelspannung  
Drehrichtung Umschaltbar  
6 Kabel  
Dual Voltage  
Clockwise and Anti  
Clockwise Rotation  
6 Leads



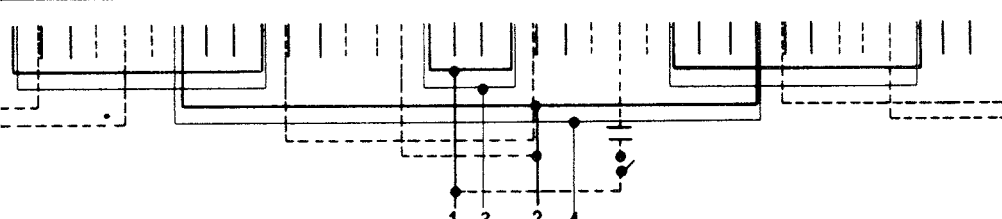
A

Dupla Tensão  
Sentido Horário  
4 Cabos  
Doppelspannung  
Drehrichtung Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Clockwise Rotation  
4 Leads



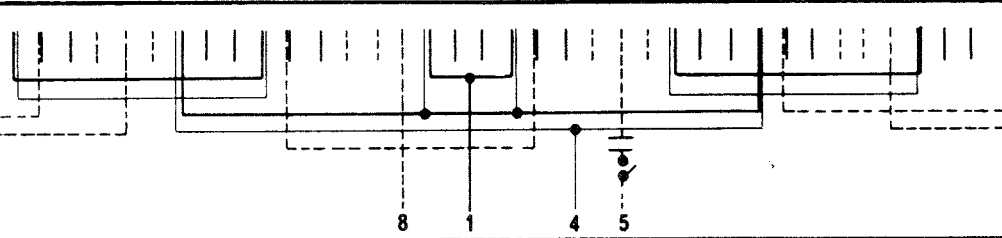
B

Dupla Tensão  
Sentido Anti-Horário  
4 Cabos  
Doppelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
4 Kabel  
Dual Voltage  
Anti Clockwise Rotation  
4 Leads



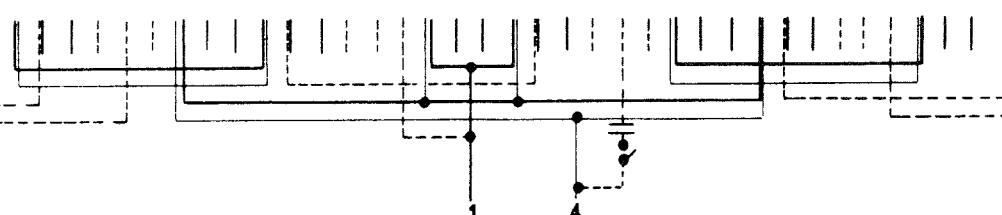
C

Tensão Única  
Duplo Sentido  
4 Cabos  
Einzelspannung  
Doppelumdrehung  
4 Kabel  
Single Voltage  
Clockwise and Anti  
Clockwise Rotation  
4 Leads



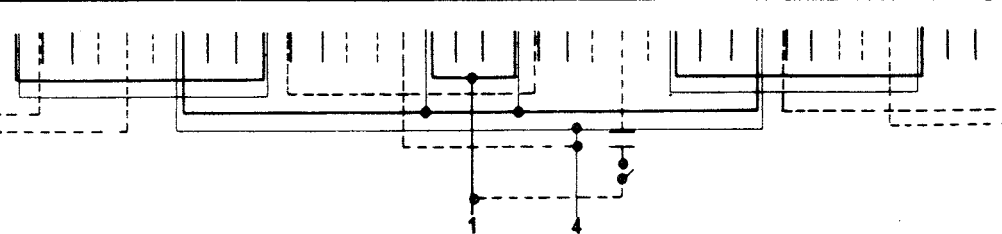
D

Tensão Única  
Sentido Horário  
2 Cabos  
Einzelspannung  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Clockwise Rotation  
2 Leads



E

Tensão Única  
Sentido Anti-Horário  
2 Cabos  
Einzelspannung  
Drehrichtung gegen  
Uhrzeigersinn  
2 Kabel  
Single Voltage  
Anti Clockwise Rotation  
2 Leads



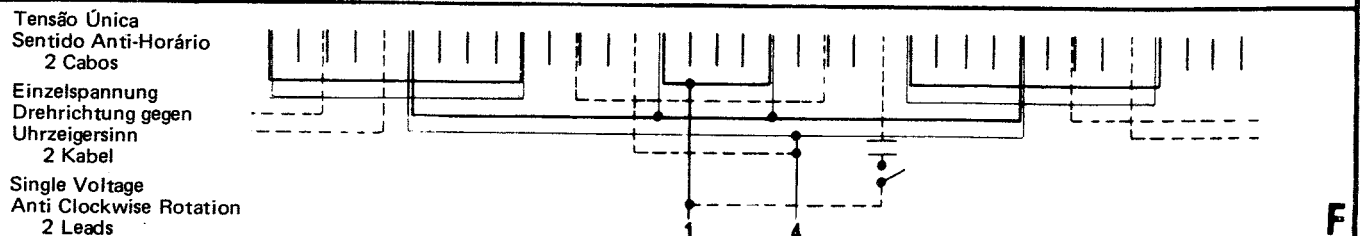
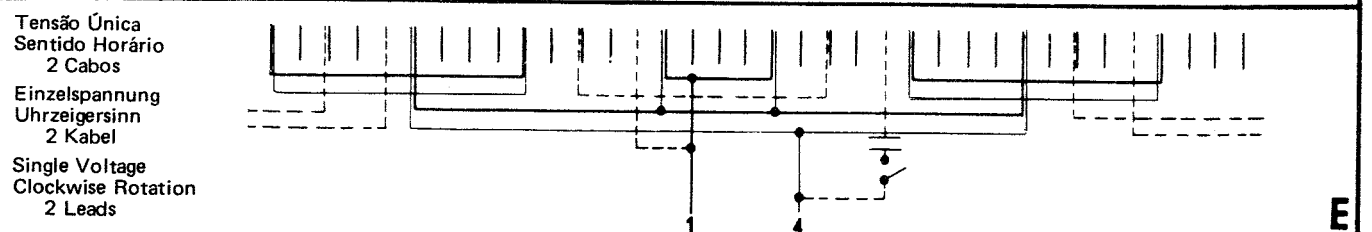
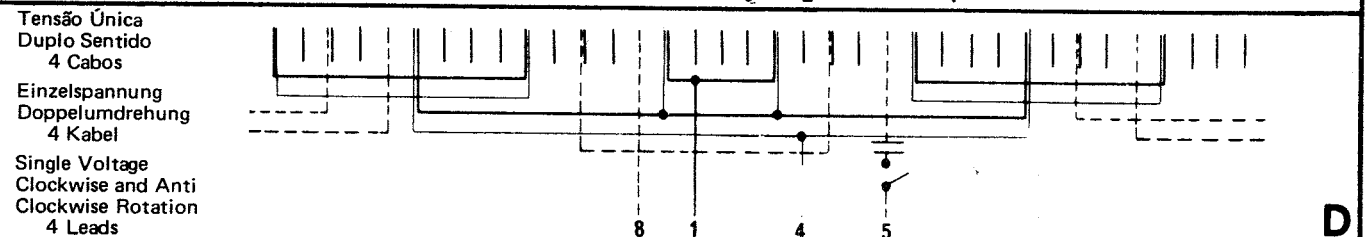
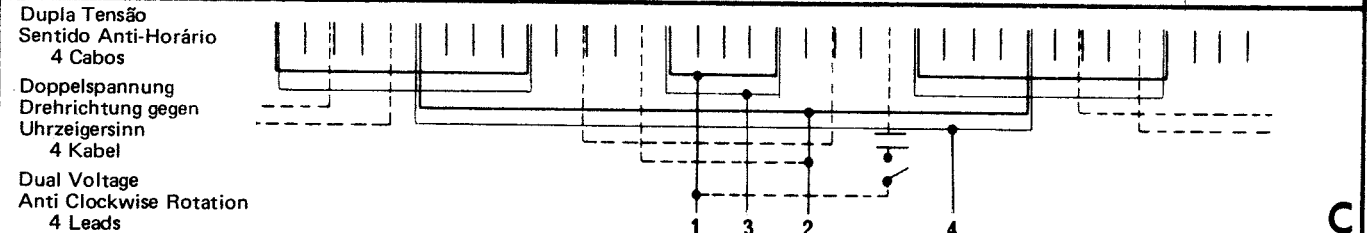
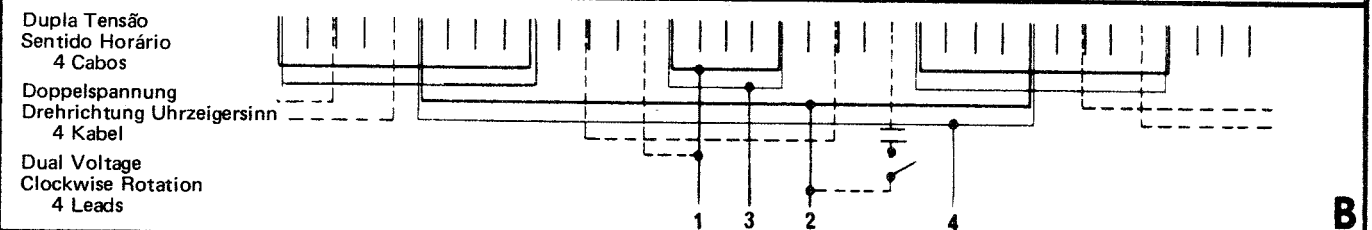
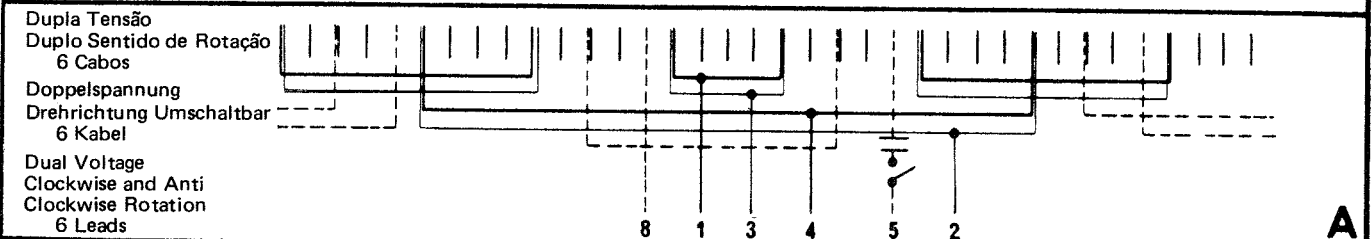
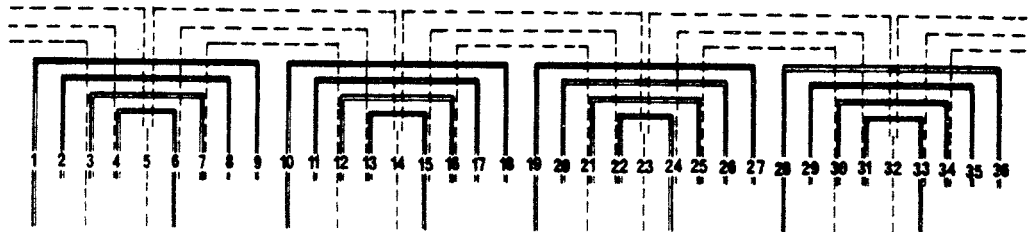
F

36 - 04 - 06/2  
(36-04-06-08/22-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	36 RANHURAS	4 POLOS	CAMADA DUPLA	PARALELO	PASSO 1:3:5:7:9 1:6:8:10
EINPHASEN	36 NUTEN	4 POLE	DOPPEL-SCHICHT	PARALLEL	WICKEL-SCHRITT 1:3:5:7:9 1:6:8:10
SINGLE-PHASE	36 SLOTS	4 POLES	TWO LAYER	PARALLEL	PITCH 1:3:5:7:9 1:6:8:10



\*Nova nomenclatura

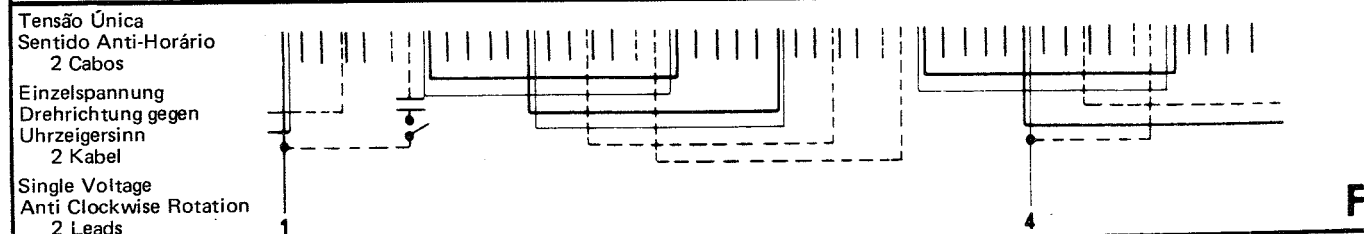
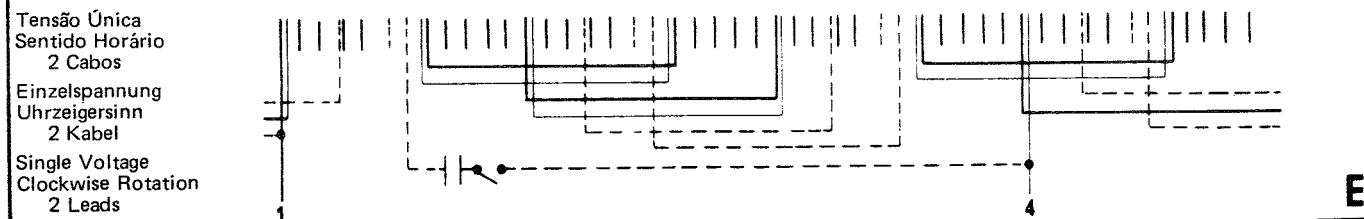
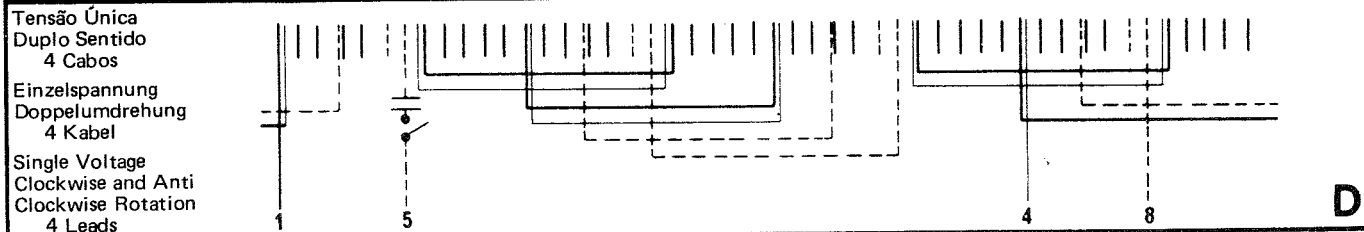
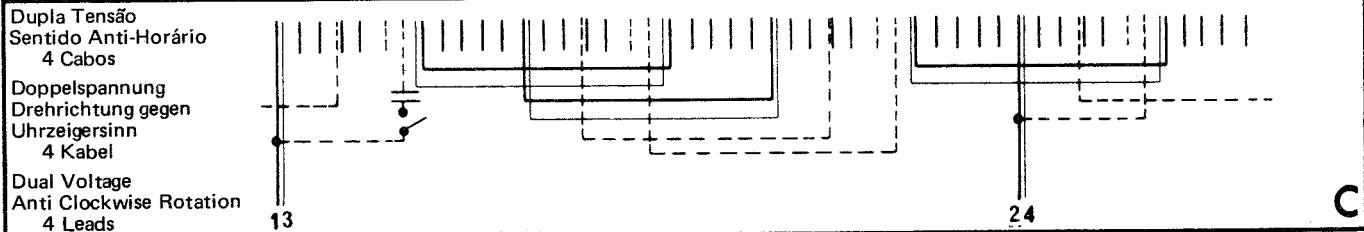
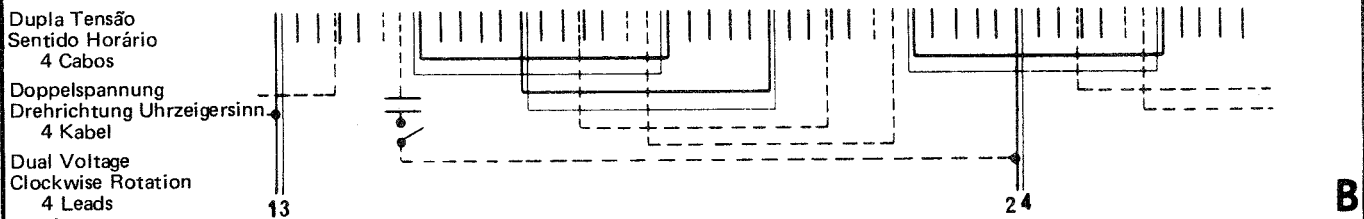
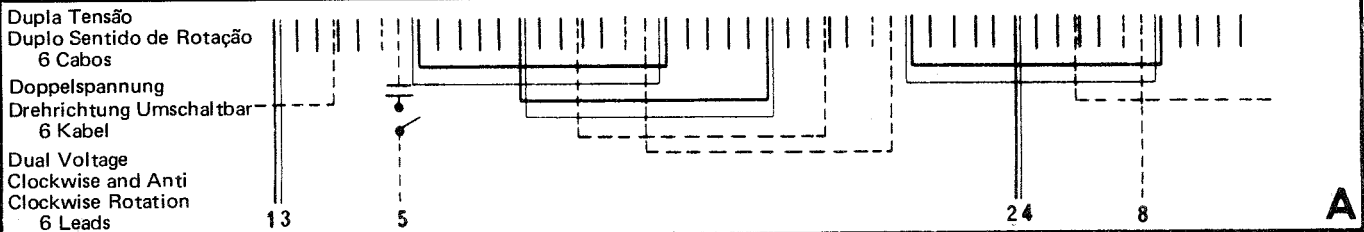
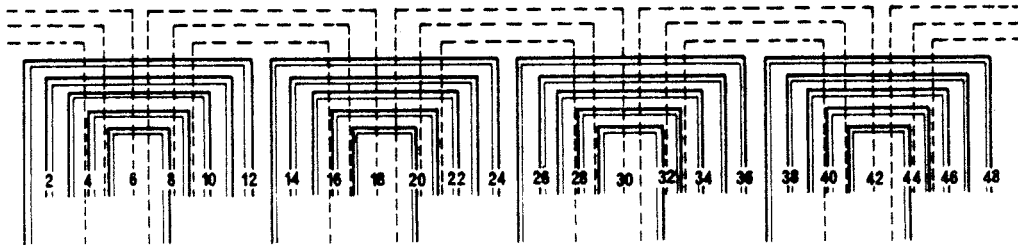




ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS

48 - 04 - 08/1  
(48-04-08-10/12-1)\*

MONOFÁSICO	48 RANHURAS	4 POLOS	CAMADA DUPLA	SÉRIE	PASSO 1:4:6:8:10:12 1:8:10:12
EINPHASEN	48 NUTEN	4 POLE	DOPPEL-SCHICHT	SERIE	WICKEL-1:4:6:8:10:12 SCHRIFFT 1:8:10:12
SINGLE-PHASE	48 SLOTS	4 POLES	TWO LAYER	SERIES	PITCH 1:4:6:8:10:12 1:8:10:12

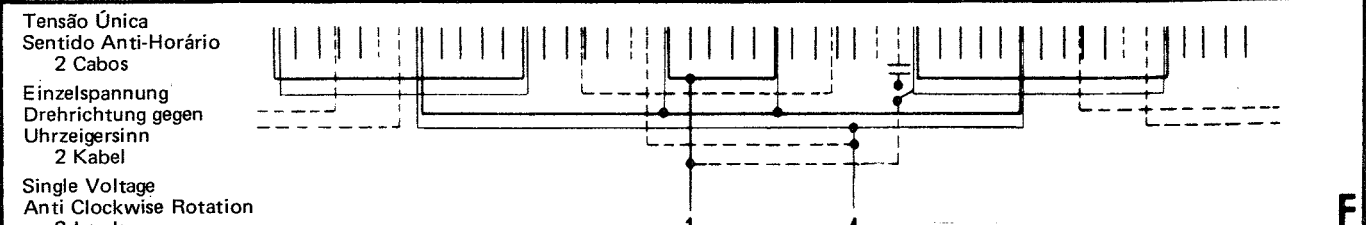
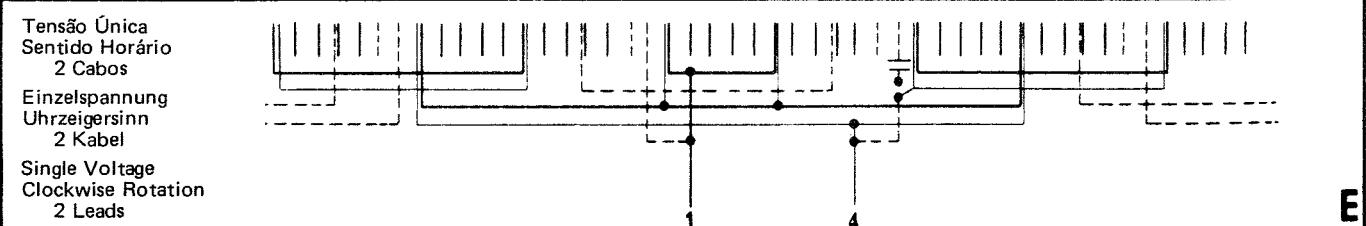
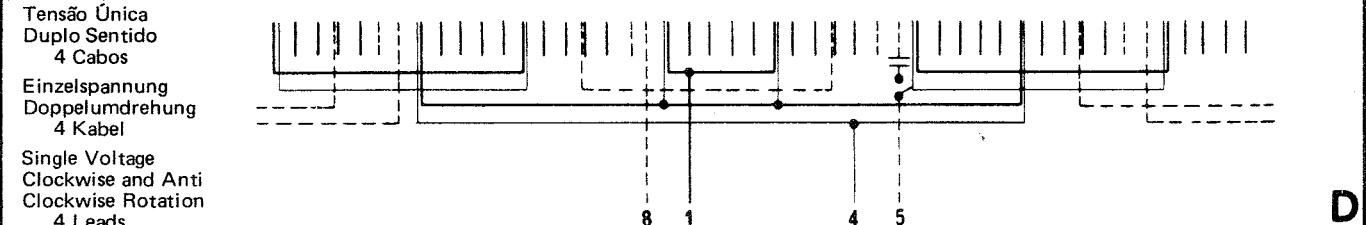
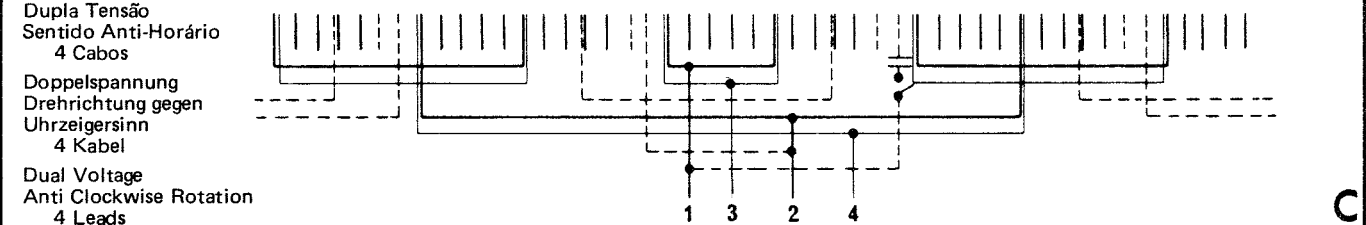
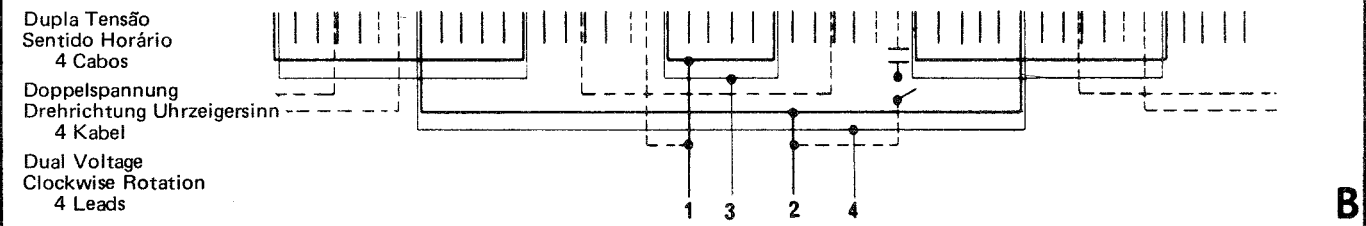
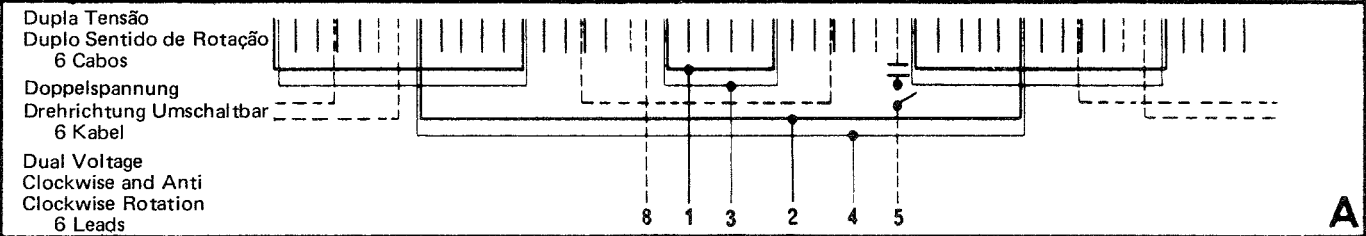
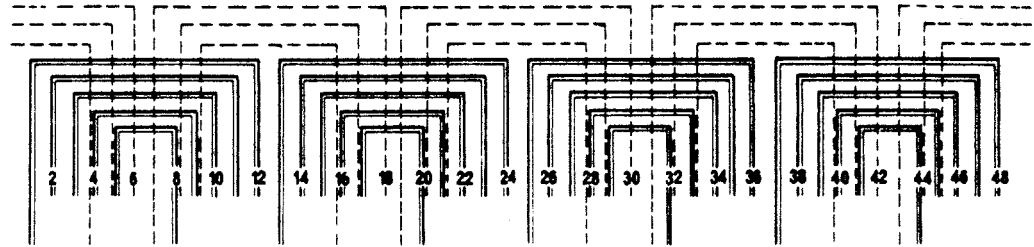


48 - 04 - 08/2  
(48-04-08-10/22-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	48 RANHURAS	4 POLOS	CAMADA DUPLA	PARALELO	PASSO 1:4:6:8:10:12 1:8:10:12
EINPHASEN	48 NUTEN	4 POLE	DOPPEL-SCHICHT	PARALLEL	WICKEL- 1:4:6:8:10:12 SCHRITT 1:8:10:12
SINGLE-PHASE	48 SLOTS	4 POLES	TWO LAYER	PARALLEL	PITCH 1:4:6:8:10:12 1:8:10:12



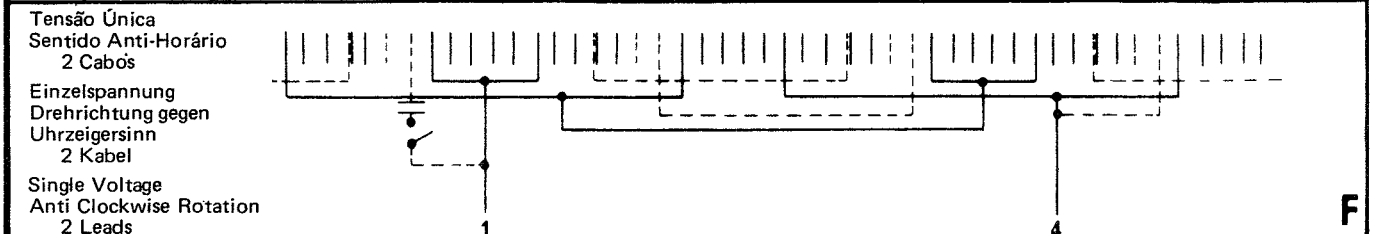
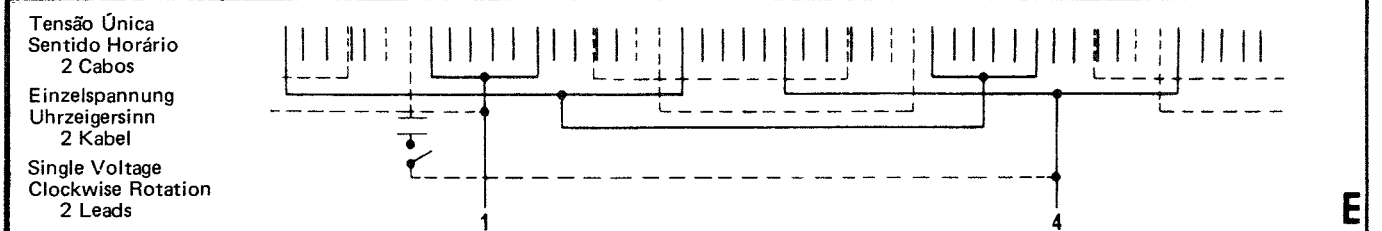
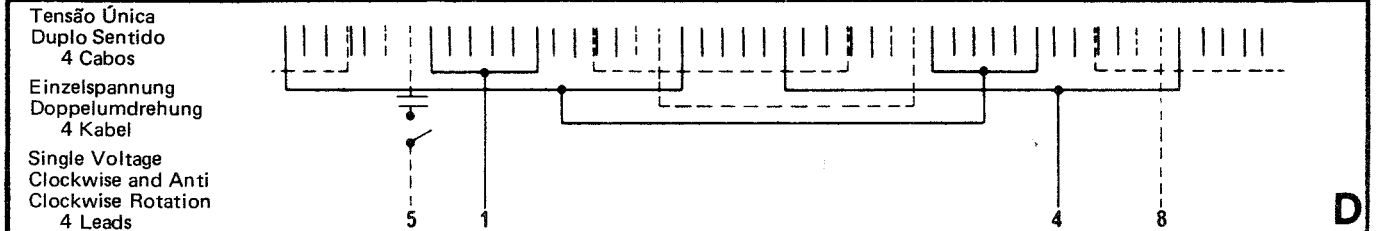
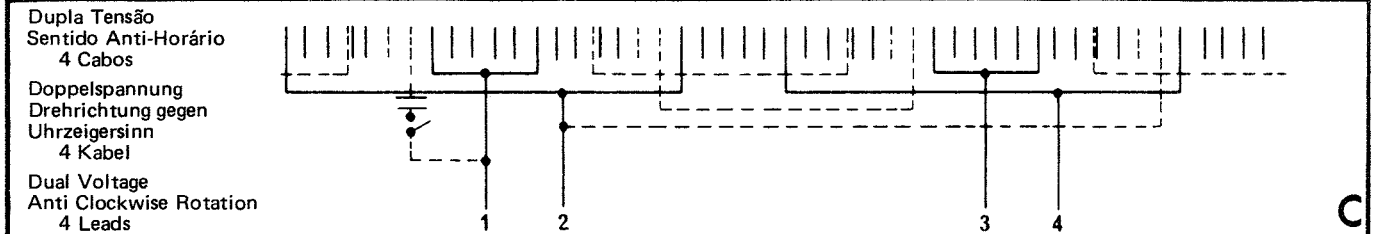
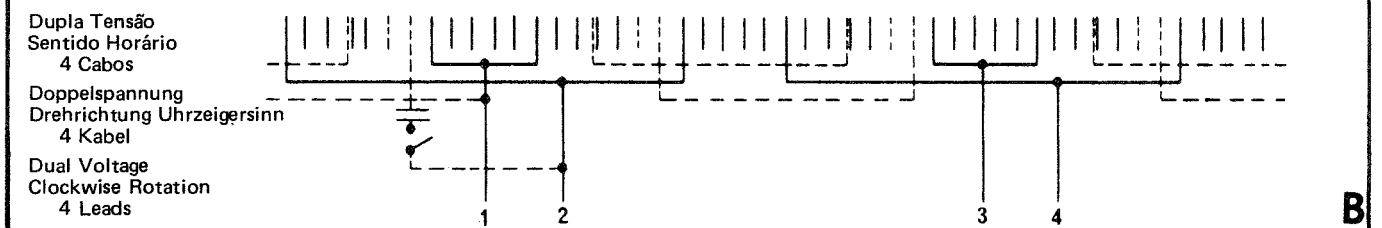
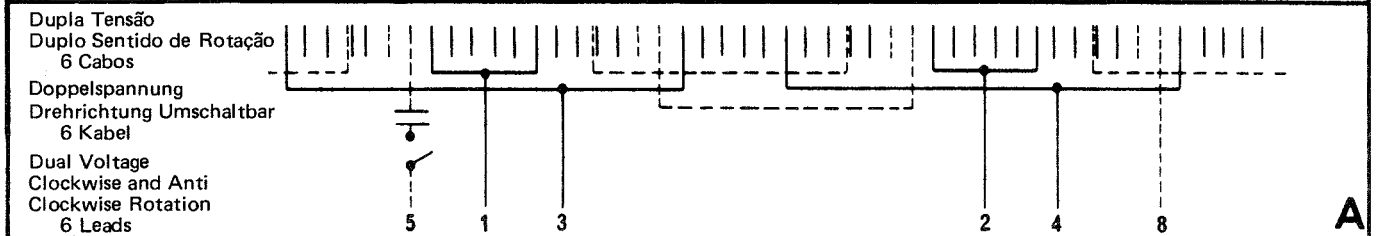
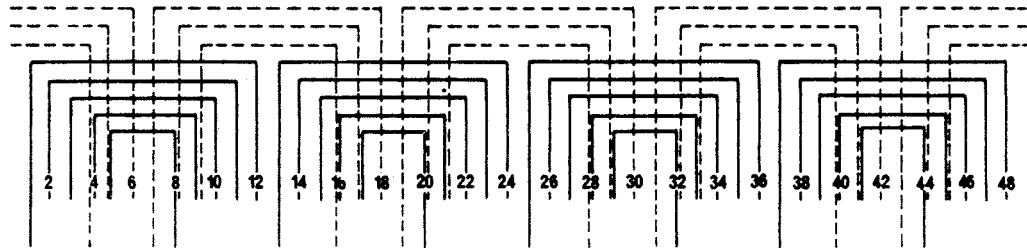
\*Nova nomenclatura



**ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS**

48 - 04 - 08/4  
(48-04-08-10/21-1)\*

MONOFÁSICO	48 RANHURAS	4 POLOS	CAMADA ÚNICA	PARALELO	PASSO 1:4:6:8:10:12 1:8:10:12
EINPHASEN	48 NUTEN	4 POLE	EINZEL-SCHICHT	PARALLEL	WICKEL-SCHRITT 1:4:6:8:10:12 1:8:10:12
SINGLE-PHASE	48 SLOTS	4 POLES	SINGLE LAYER	PARALLEL	PITCH 1:4:6:8:10:12 1:8:10:12

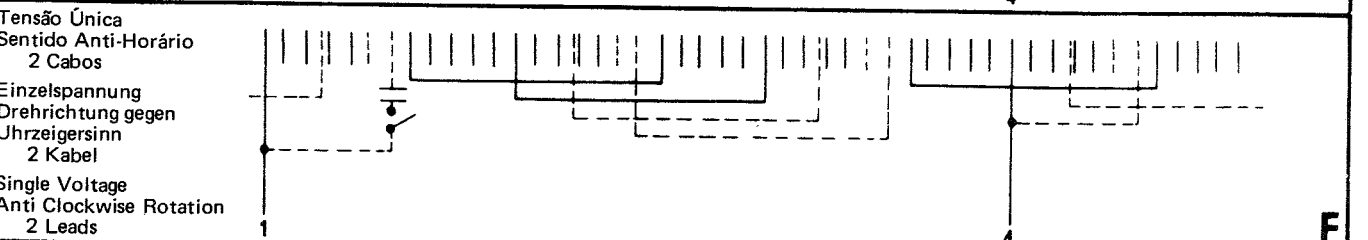
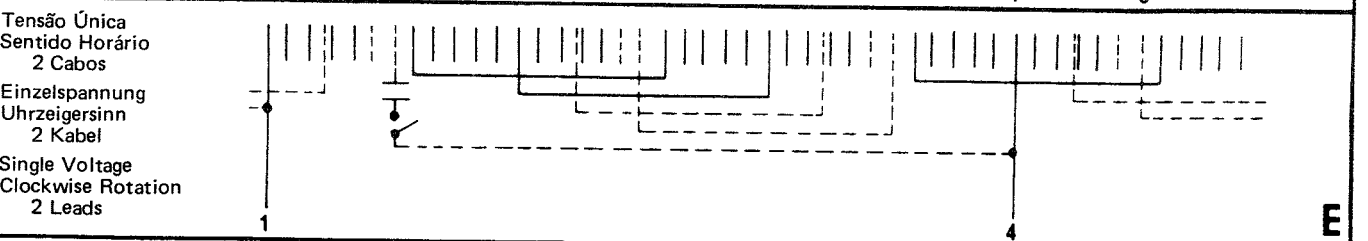
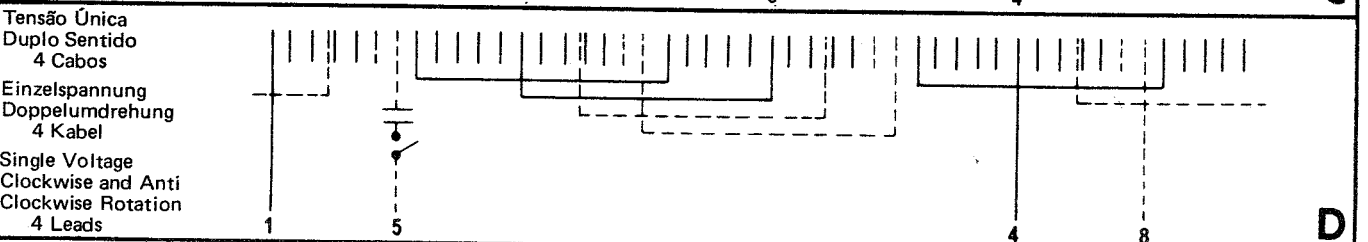
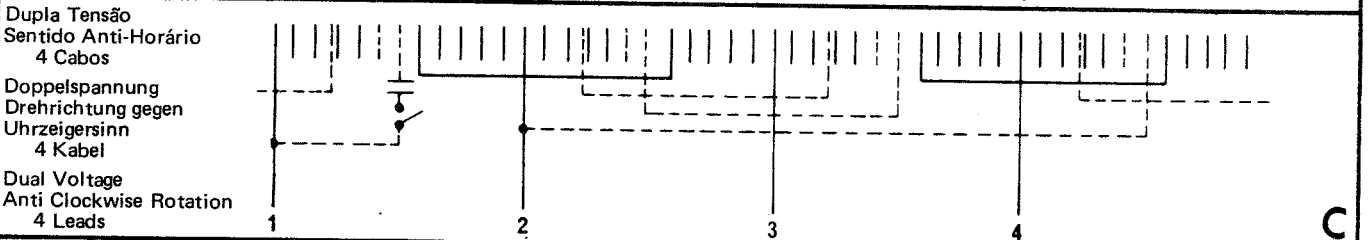
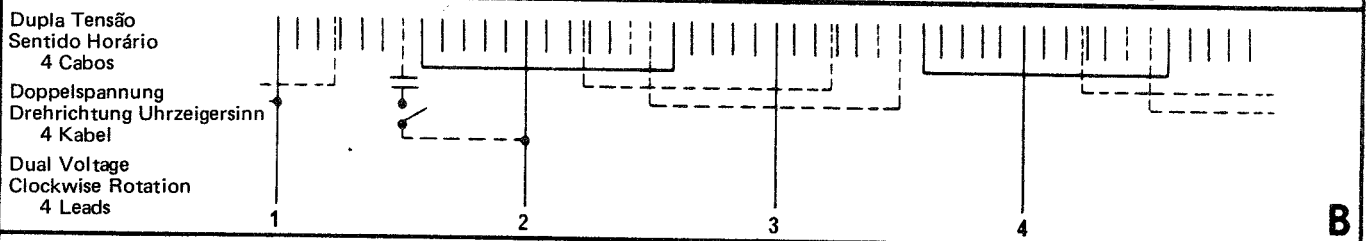
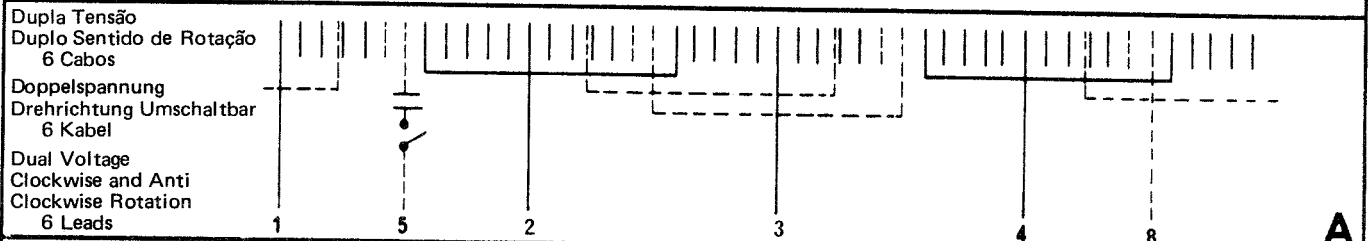
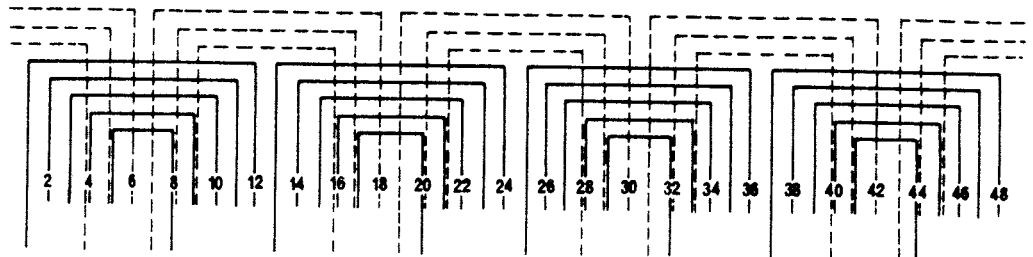


48 - 04 - 08/5  
(48-04-08-10/11-1)\*

ESQUEMAS DE BOBINAGEM  
WICKELSCHEMEN  
WINDING DIAGRAMS



MONOFÁSICO	48 RANHURAS	4 POLOS	CAMADA ÚNICA	SÉRIE	PASSO 1:4:6:8:10:12 1:8:10:12
EINPHASEN	48 NUTEN	4 POLE	EINZEL-SCHICHT	SERIE	WICKEL- 1:4:6:8:10:12 SCHRITT 1:8:10:12
SINGLE-PHASE	48 SLOTS	4 POLES	SINGLE LAYER	SERIES	PITCH 1:4:6:8:10:12 1:8:10:12



\*Nova nomenclatura

