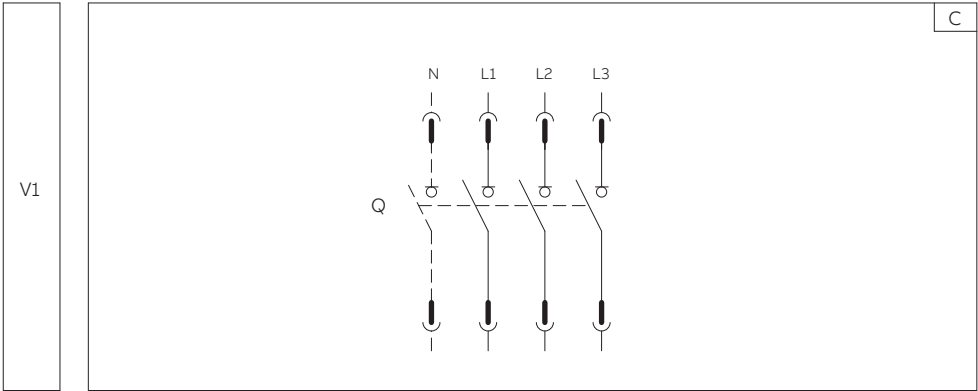


Ekip G Dip LS/I

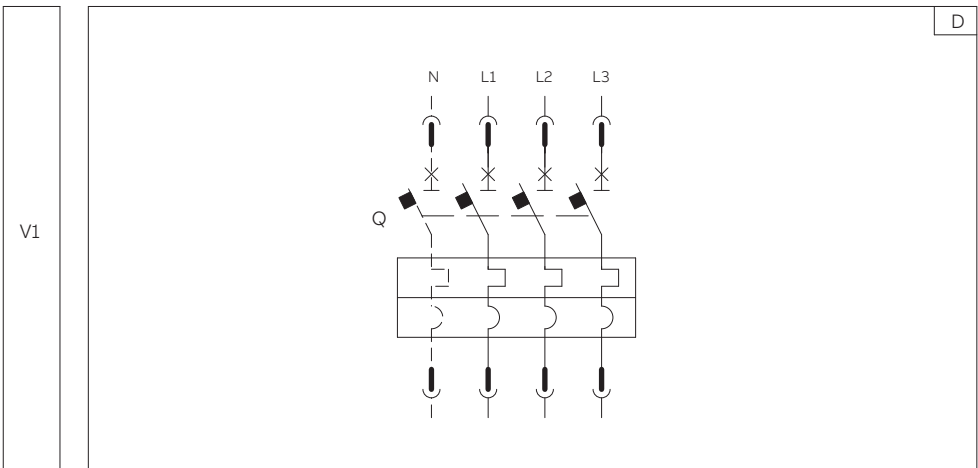


1SDM000068R0DWG

INTERRUTTORE DI MANOVRA-SEZIONATORE
TRIPOLARE O TETRAPOLARE XT1D, XT2D, XT3D O XT4D
3-POLE OR 4-POLE SWITCH-DISCONNECTOR
XT1D, XT2D, XT3D OR XT4D

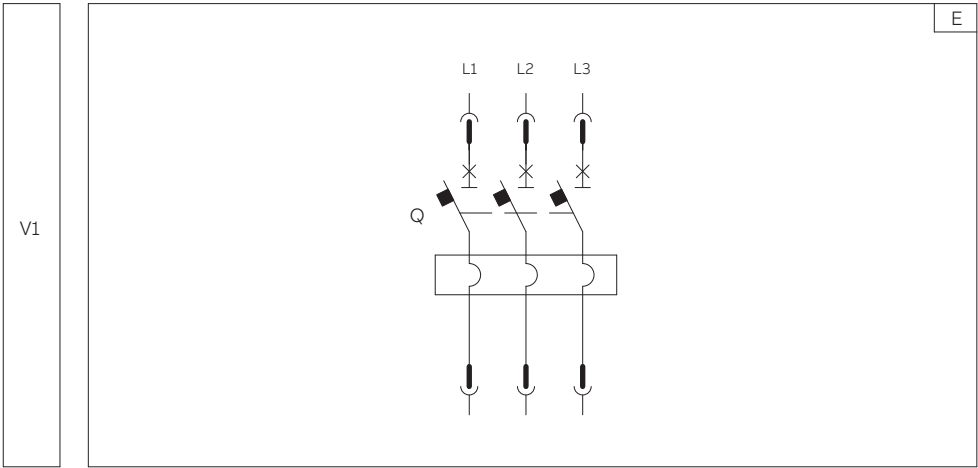


INTERRUTTORE TRIPOLARE O TETRAPOLARE
CON RELE' TERMOMAGNETICO
3-POLE OR 4-POLE C.BREAKER
WITH THERMOMAGNETIC RELEASE



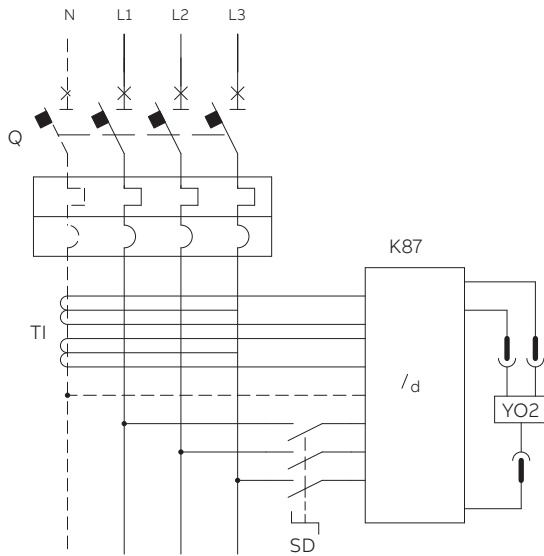
TMD
TMA
TMG
TMF

INTERRUTTORE TRIPOLARE
CON RELE' MAGNETICO
3-POLE C.BREAKER
WITH MAGNETIC RELEASE



MF
MA

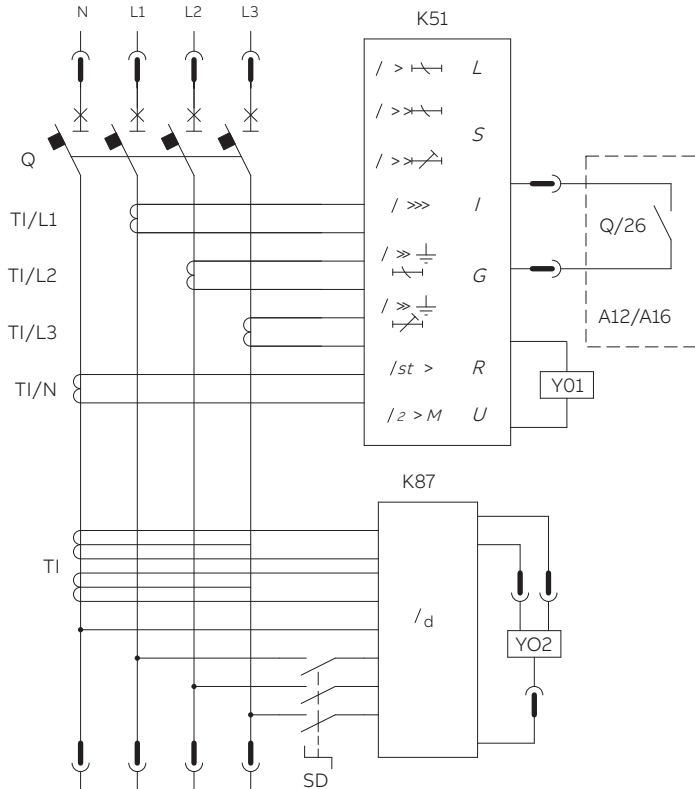
INTERRUTTORE TRIPOLARE O TETRAPOLARE
CON RELE' TERMOMAGNETICO E RELE' DIFFERENZIALE
3-POLE OR 4-POLE C.BREAKER
WITH THERMOMAGNETIC RELAY AND RESIDUAL CURRENT RELEASE



F

TM. + RC Inst	(solo per XT1-XT3 in esecuzione fissa) (only for fixed version XT1-XT3)
TM. + RC Sel	(anche per int.ri in esecuzione estraibile o rimovibile) (also for plug-in or withdrawable version c breakers)
TM. + RC Sel 200	(solo per XT1-XT3 tetrapolari) (only for 4-pole XT1-XT3)
TM. + RC B Type	(solo per XT3 tetrapolari) (only for 4-pole XT3)

INTERRUTTORE TETRAPOLARE
CON RELE' ELETTRONICO E RELE' DIFFERENZIALE
(SOLO PER INTERRUTTORI XT2-XT4)
4-POLE C.BREAKER
WITH ELECTRONIC RELAY AND RESIDUAL CURRENT RELEASE
(ONLY FOR XT2-XT4 C. BREAKERS)

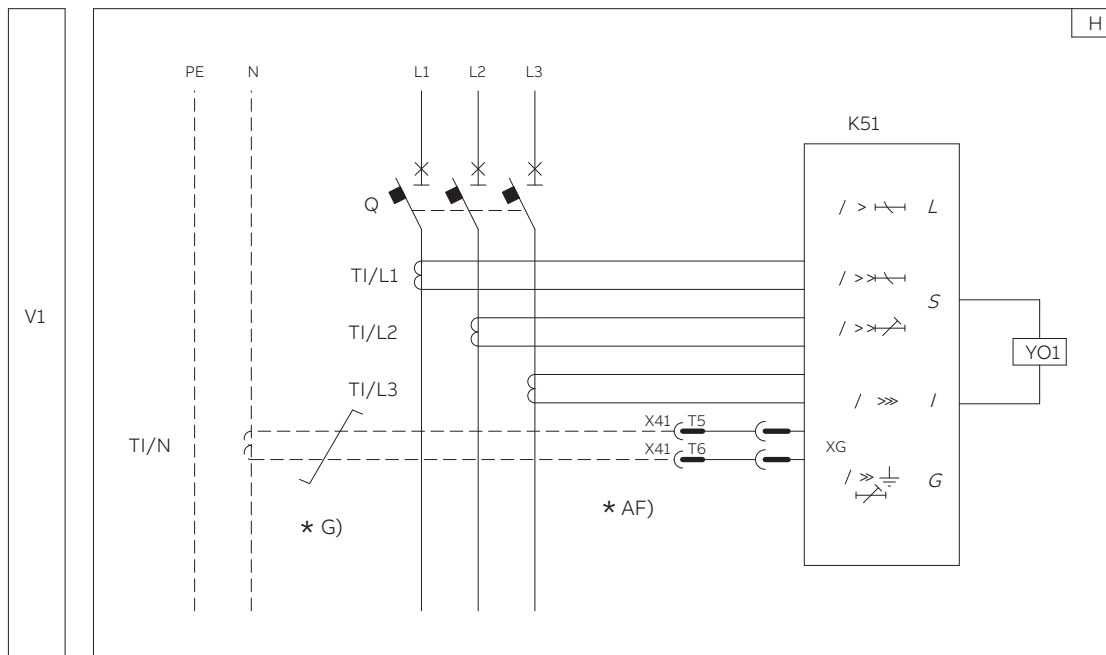


G

Ekip ... + RC Sel	(solo per XT2-XT4) (only for XT2-XT4)
-------------------	--

INTERRUTTORE TRIPOLARE IN ESECUZIONE FISSA CON RELE' ELETTRONICO BASE E CON TRASFORMATORE DI CORRENTE SU CONDUTTORE NEUTRO ESTERNO ALL'INTERRUTTORE (SOLO PER INTERRUTTORI XT2-XT4)

FIXED VERSION 3-POLE C.BREAKER WITH BASIC ELECTRONIC RELAY AND WITH CURRENT TRANSFORMER ON NEUTRAL CONDUCTOR, EXTERNAL TO C.BREAKER (ONLY FOR XT2-XT4 C. BREAKERS)



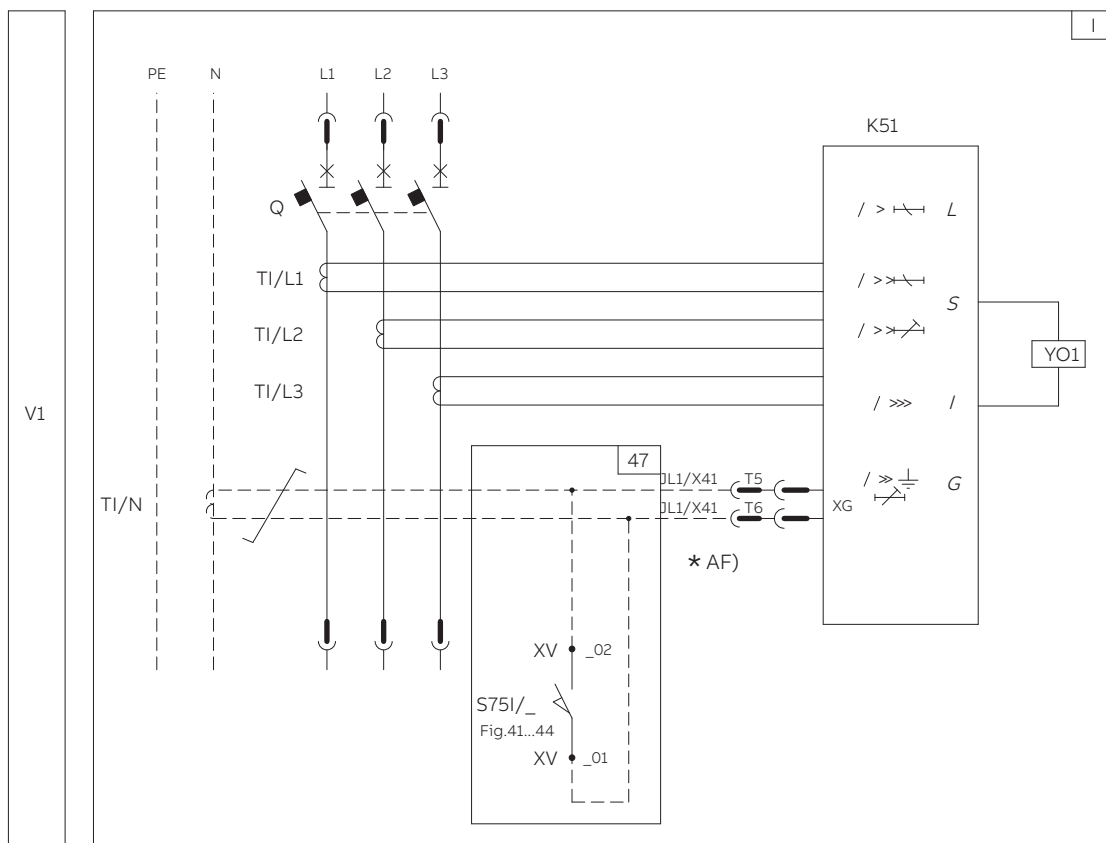
Ekip Dip LIG

Ekip Dip LSI

Ekip Dip LSIG

SCHEMA CONSIGLIATO PER INTERRUTTORE TRIPOLARE IN ESECUZIONE RIMOVIBILE O ESTRAIBILE CON RELE' ELETTRONICO BASE E CON TRASFORMATORE DI CORRENTE SU CONDUTTORE NEUTRO ESTERNO ALL'INTERRUTTORE (SOLO PER INTERRUTTORI XT2-XT4)

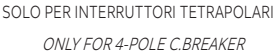
ADVISABLE DIAGRAM FOR PLUG-IN OR WITHDRAWABLE VERSION 3-POLE C.BREAKER WITH BASIC ELECTRONIC RELAY AND WITH CURRENT TRANSFORMER ON NEUTRAL CONDUCTOR, EXTERNAL TO C.BREAKER (ONLY FOR XT2-XT4 C. BREAKERS)

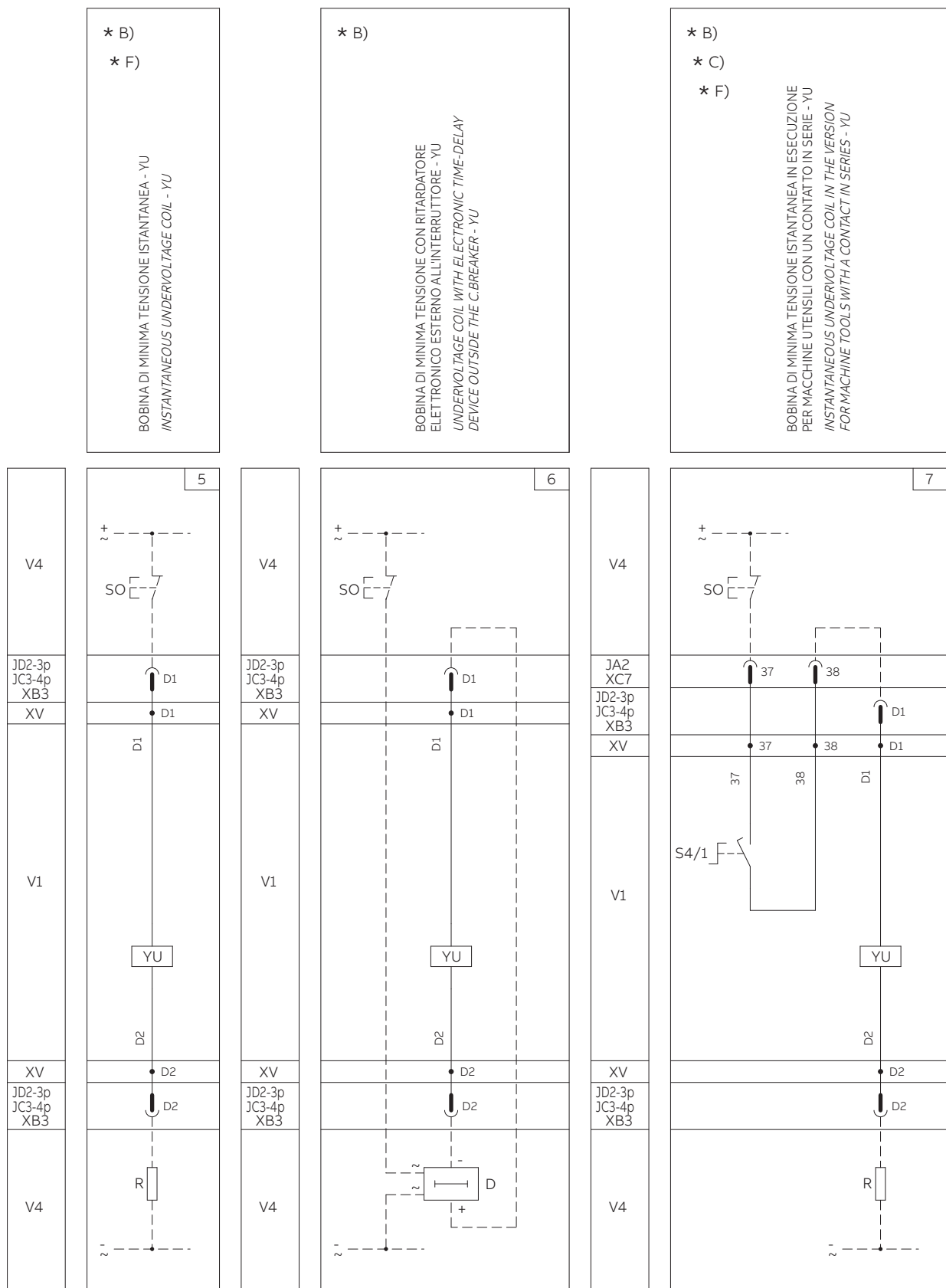


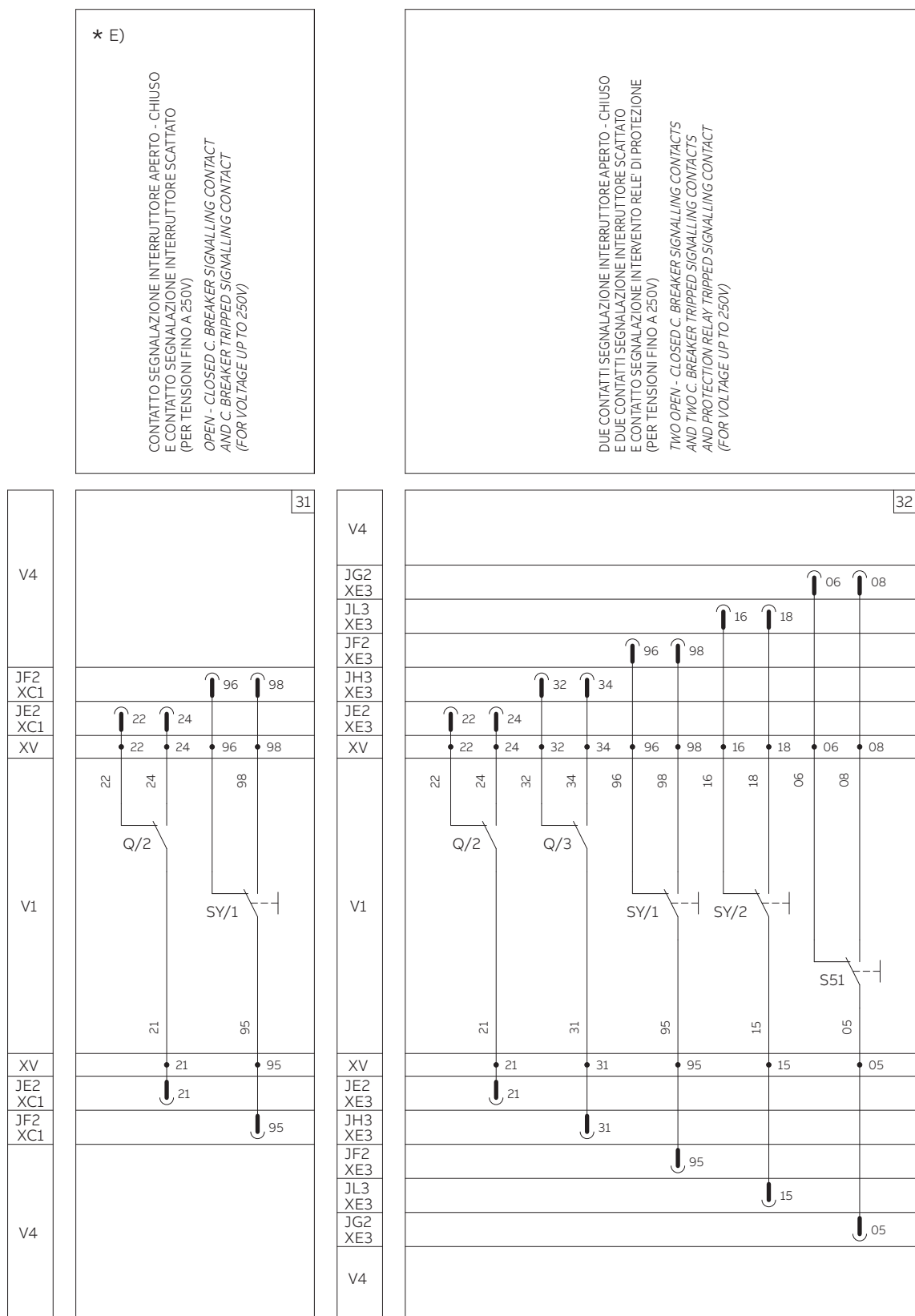
Ekip Dip LIG

Ekip Dip LSI

Ekip Dip LSIG

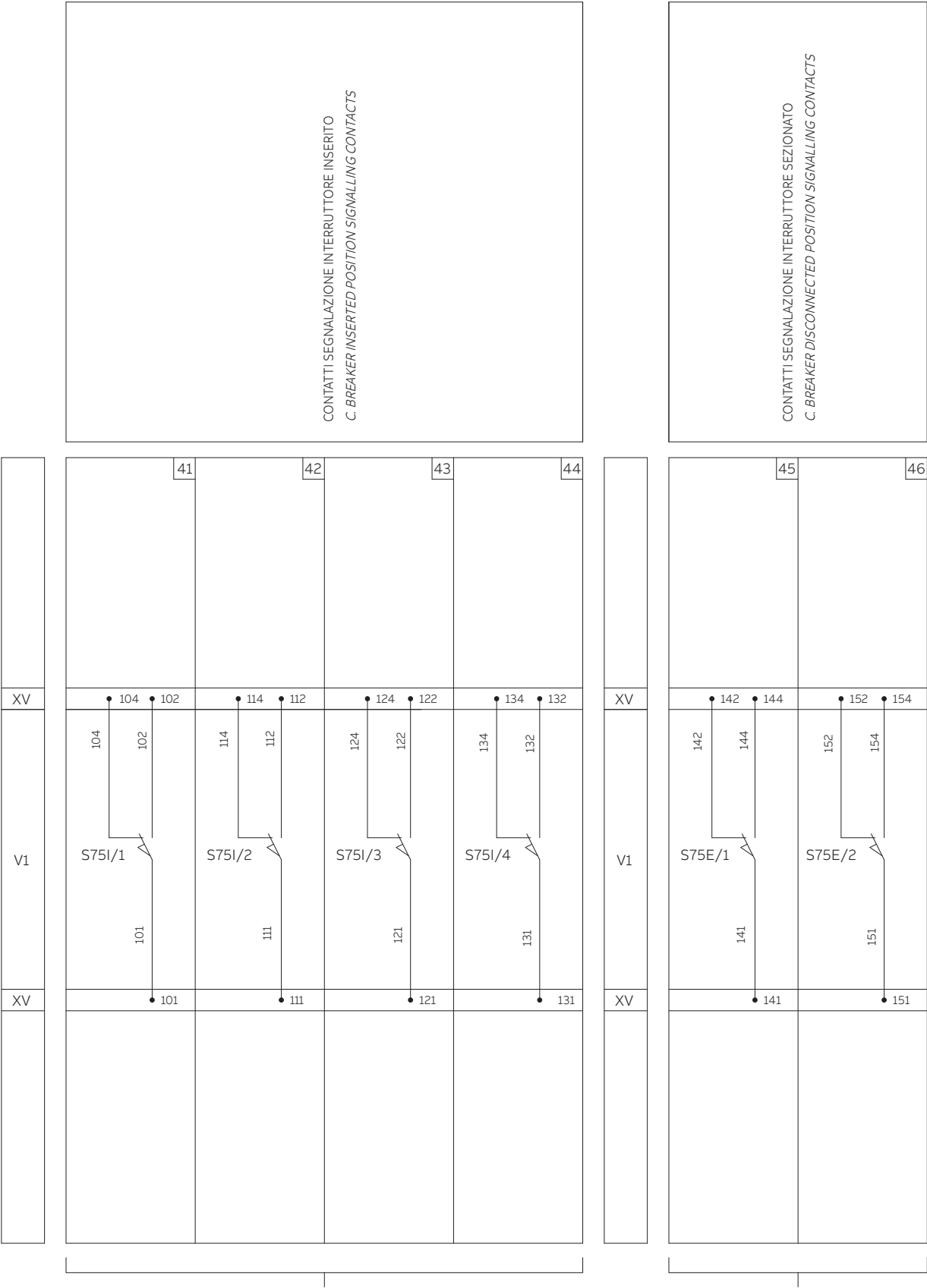






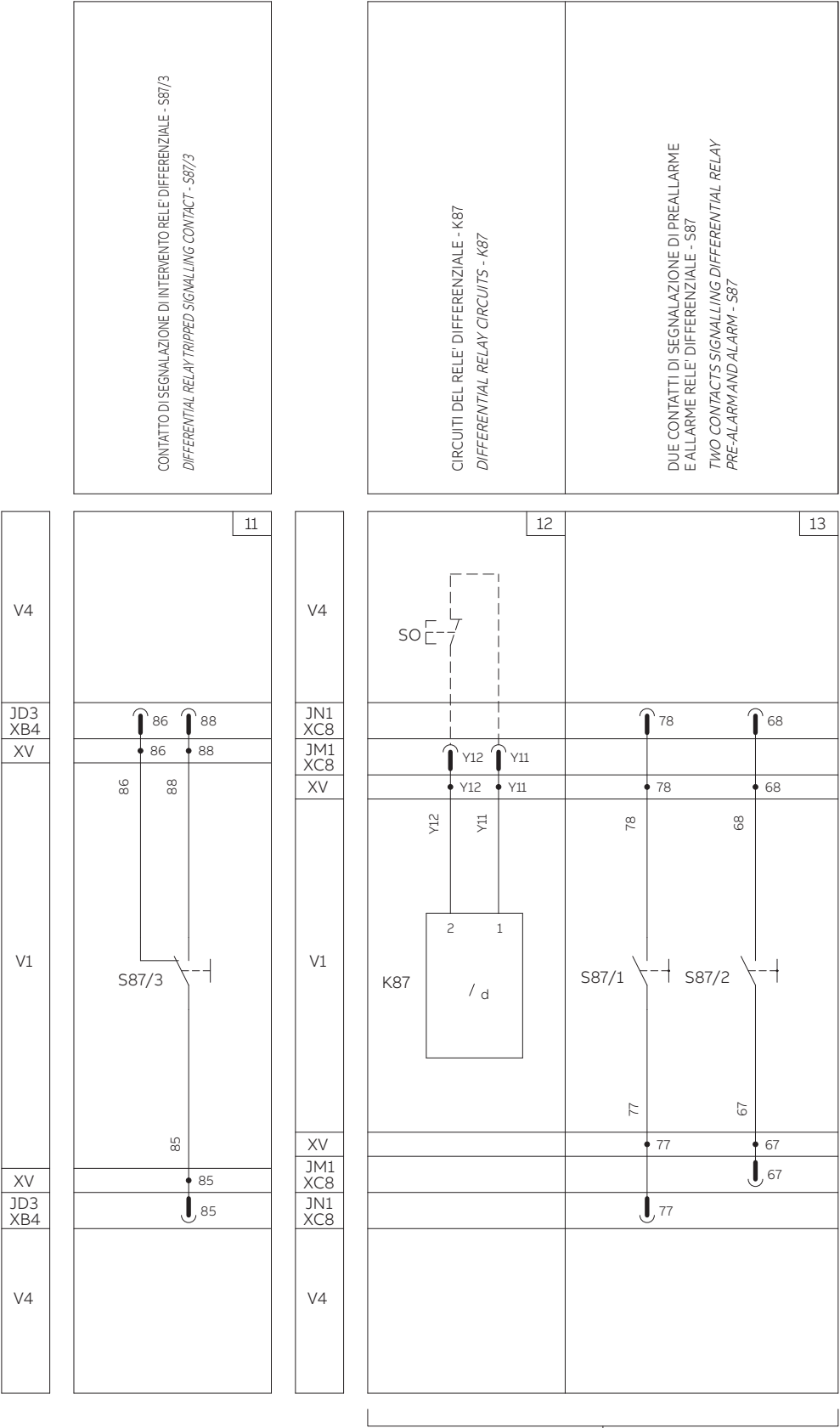




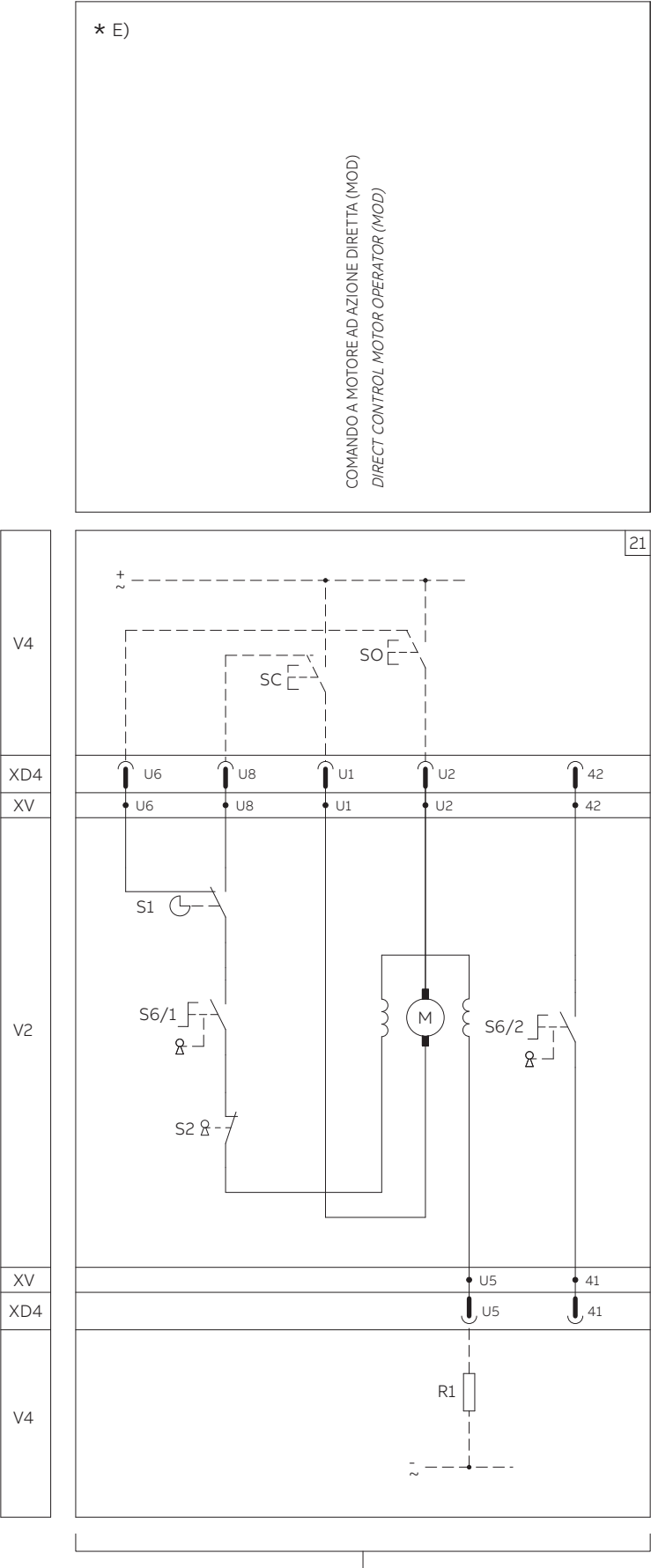


SOLO PER INTERRUITORI IN ESECUZIONE RIMOVIBILE O ESTRAIBILE
ONLY FOR PLUG-IN OR WITHDRAWABLE VERSION C.BREAKER

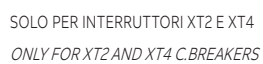
SOLO PER INTERRUITORI IN ESECUZIONE ESTRAIBILE
ONLY FOR WITHDRAWABLE VERSION C.BREAKER

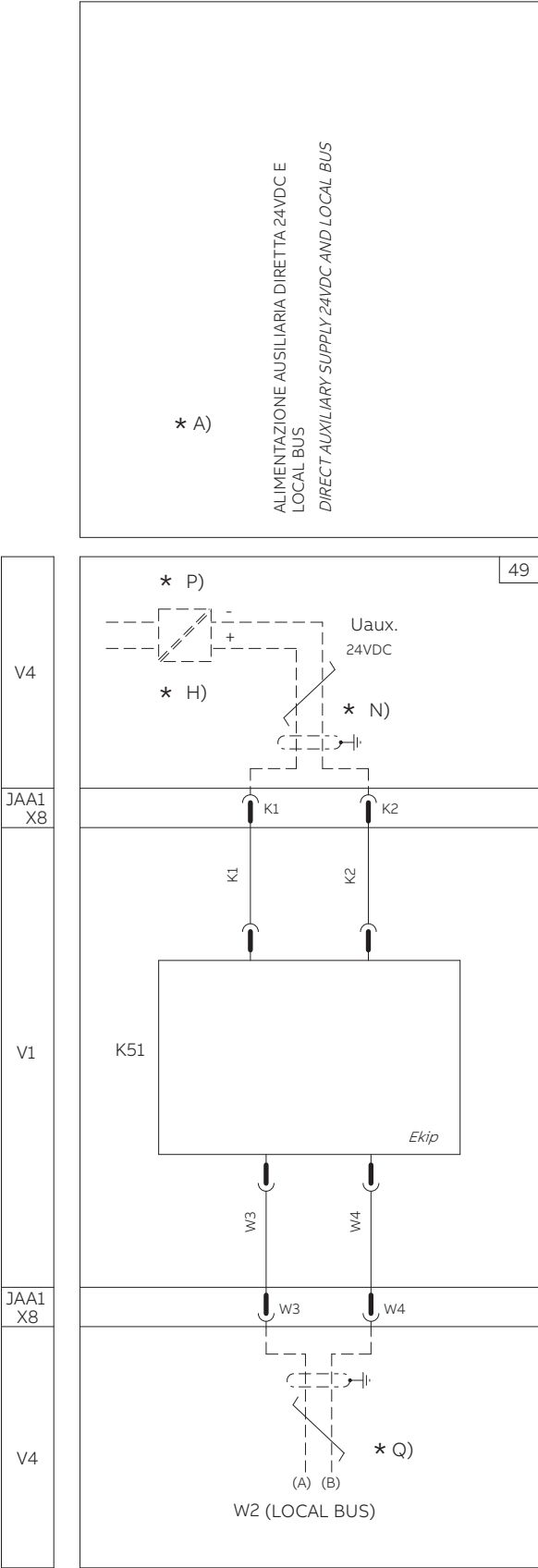


SOLO PER RELE' DIFFERENZIALI TIPO RC Sel - RC B Type - RC Sel 200
ONLY FOR DIFFERENTIAL RELAY TYPE RC Sel - RC B Type - RC Sel 200

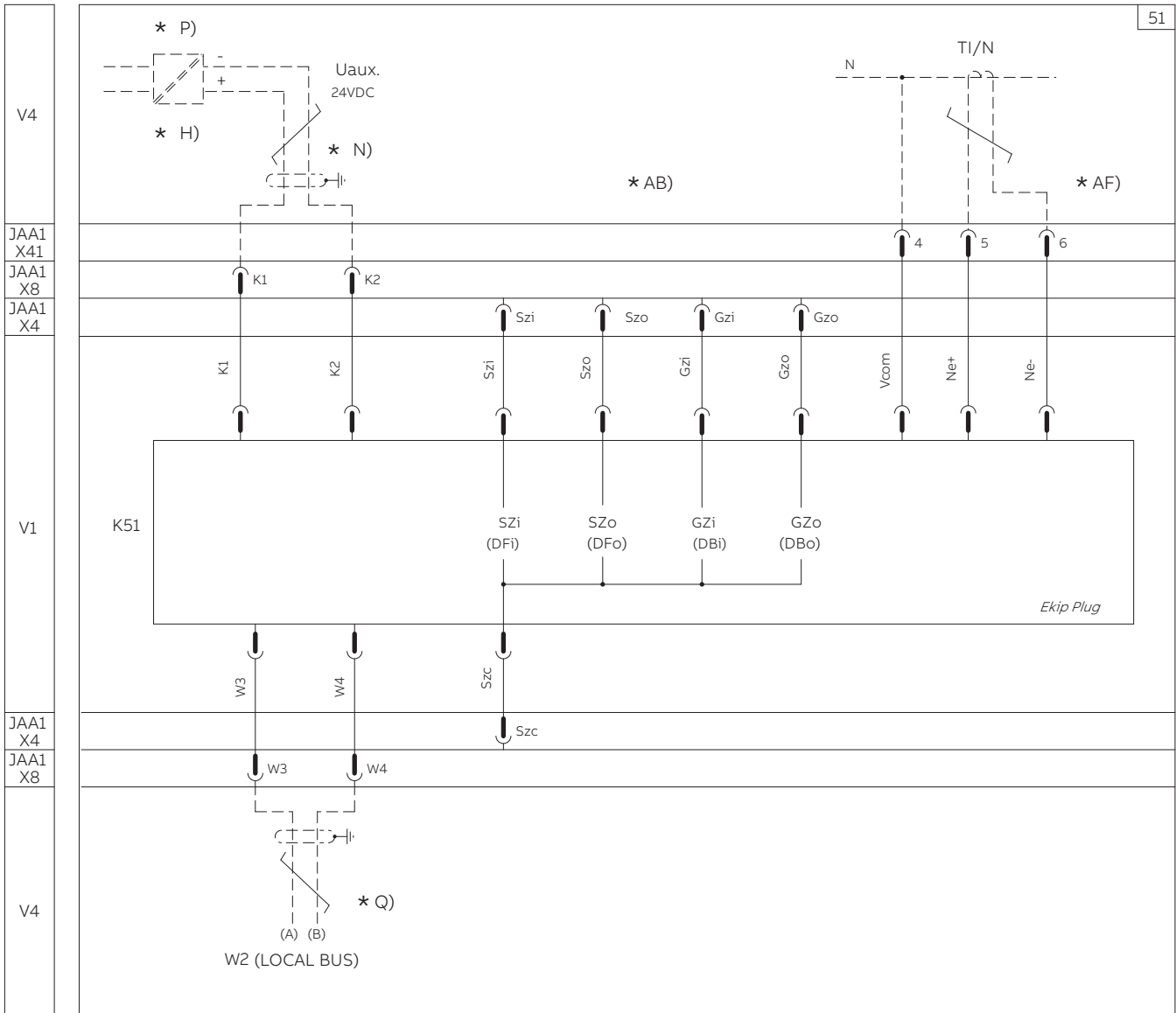
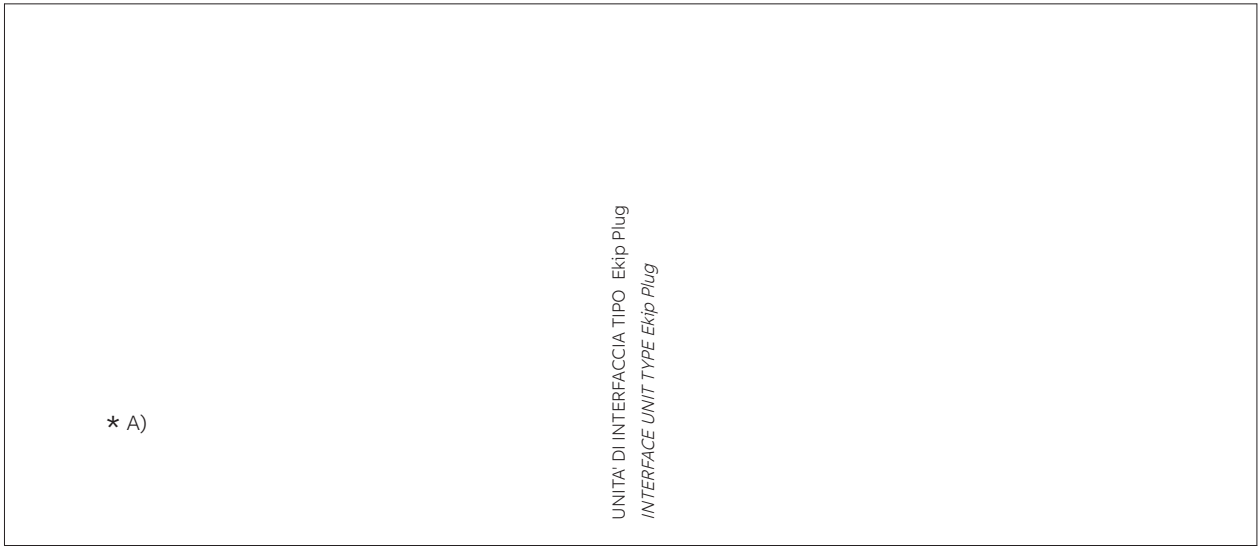


SOLO PER INTERRUTTORI XT1 E XT3 IN ESECUZIONE FISSA O RIMOVIBILE
 ONLY FOR XT1 AND XT3 FIXED OR PLUG-IN VERSION C.BREAKERS





IN ALTERNATIVA ALLA FIGURA 81
AS AN ALTERNATIVE TO FIGURE 81



UNITA DI INTERFACCIA TIPO Ekip Com
 INTERFACE UNIT TYPE Ekip Com

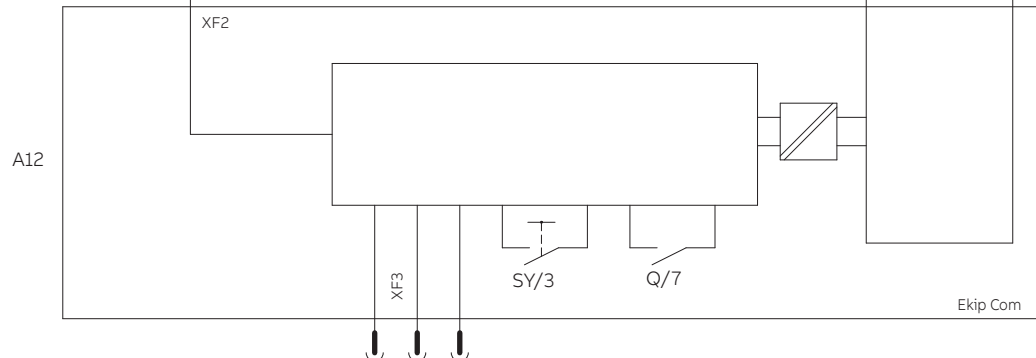
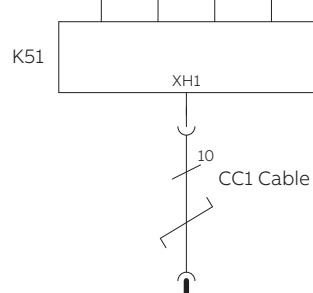
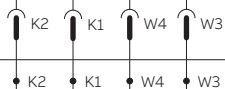
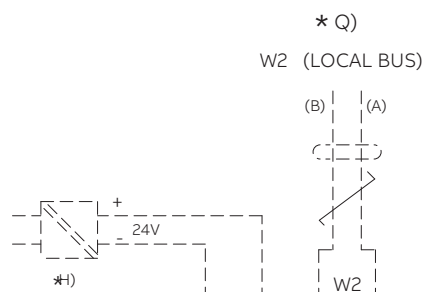
52

V4

X8
 XC5
 JAA1

XV

V1





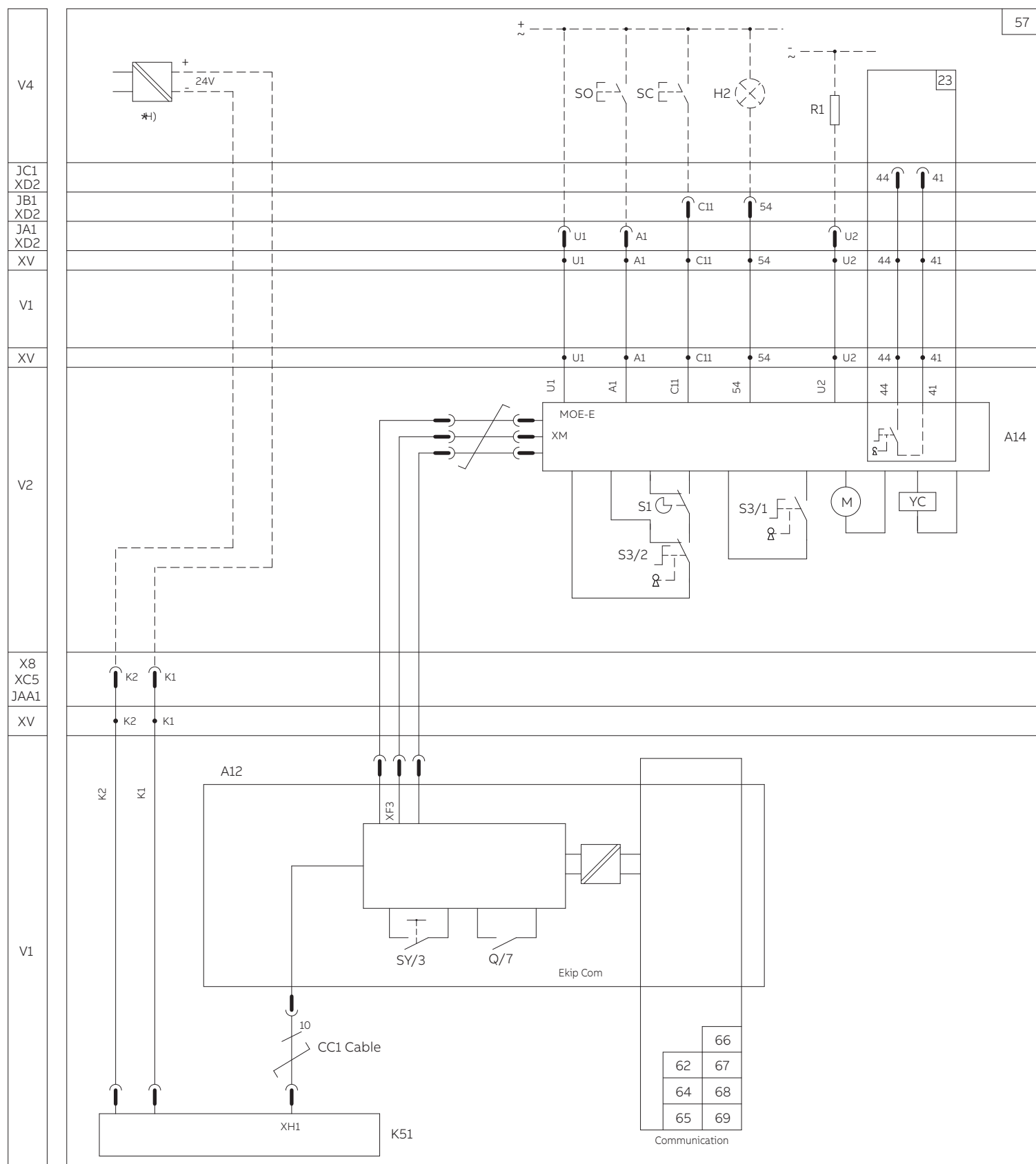
UNITA' DI INTERFACCIA TIPO Ekip Com
CON ALIMENTAZIONE DIRETTA AL RELE'
E COMANDO A MOTORE MOE-E

INTERFACE UNIT TYPE Ekip Com
WITH DIRECT SUPPLY TO RELAY AND
MOE-E MOTOR OPERATOR



CONTATTO SEGNALAZIONE COMANDO
COMANDO MOTORE AZIONABILE
DA REMOTO

*MOTOR OPERATOR CONTROLLABLE
IN THE REMOTE MODE
SIGNALLING CONTACT*

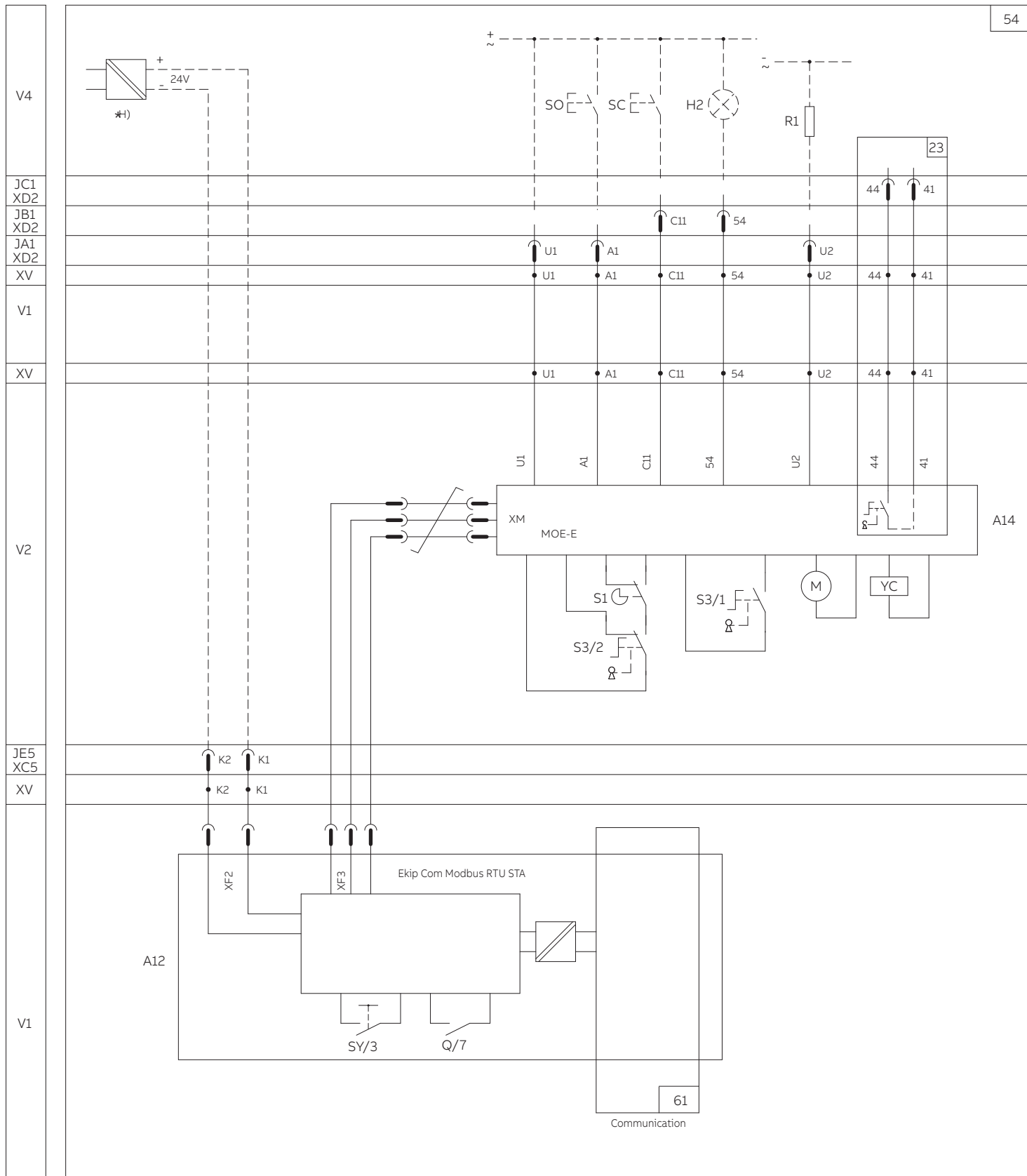


54

UNITA' DI INTERFACCIA TIPO Ekip Com
Modbus STAND ALONE CON COMANDO
A MOTORE MOE-E
STAND ALONE INTERFACE UNIT TYPE
Ekip Com Modbus WITH
MOE-E MOTOR OPERATOR

23

CONTATTO SEGNALE COMANDO
COMANDO A MOTORE AZIONABILE
DA REMOTO
MOTOR OPERATOR CONTROLLABLE
IN THE REMOTE MODE
SIGNALLING CONTACT



56

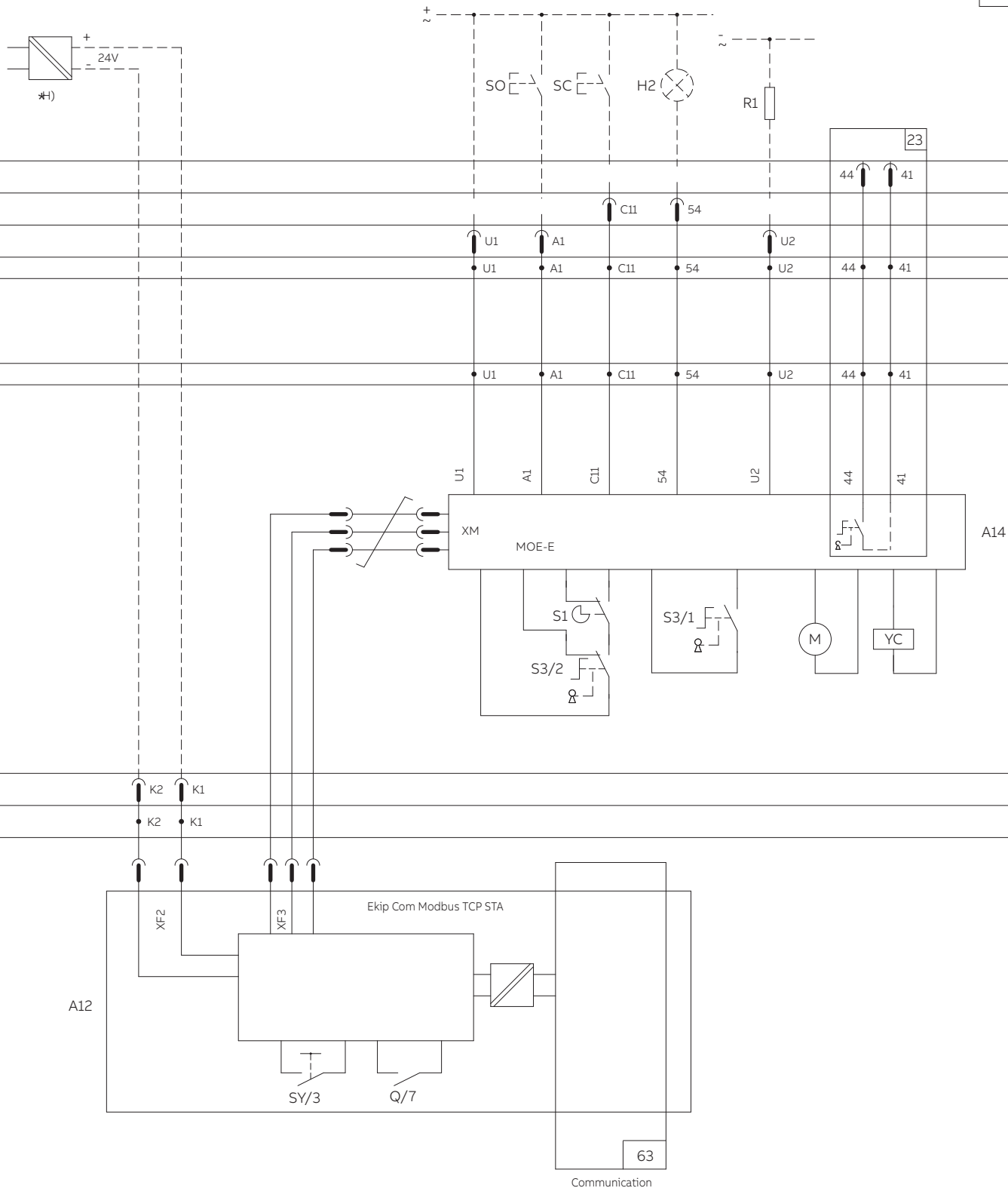
UNITA' DI INTERFACCIA TIPO Ekip Com
TCP STAND ALONE CON COMANDO A
MOTORE MOE-E
STAND ALONE INTERFACE UNIT TYPE
Ekip Com TCP WITH MOE-E MOTOR
OPERATOR

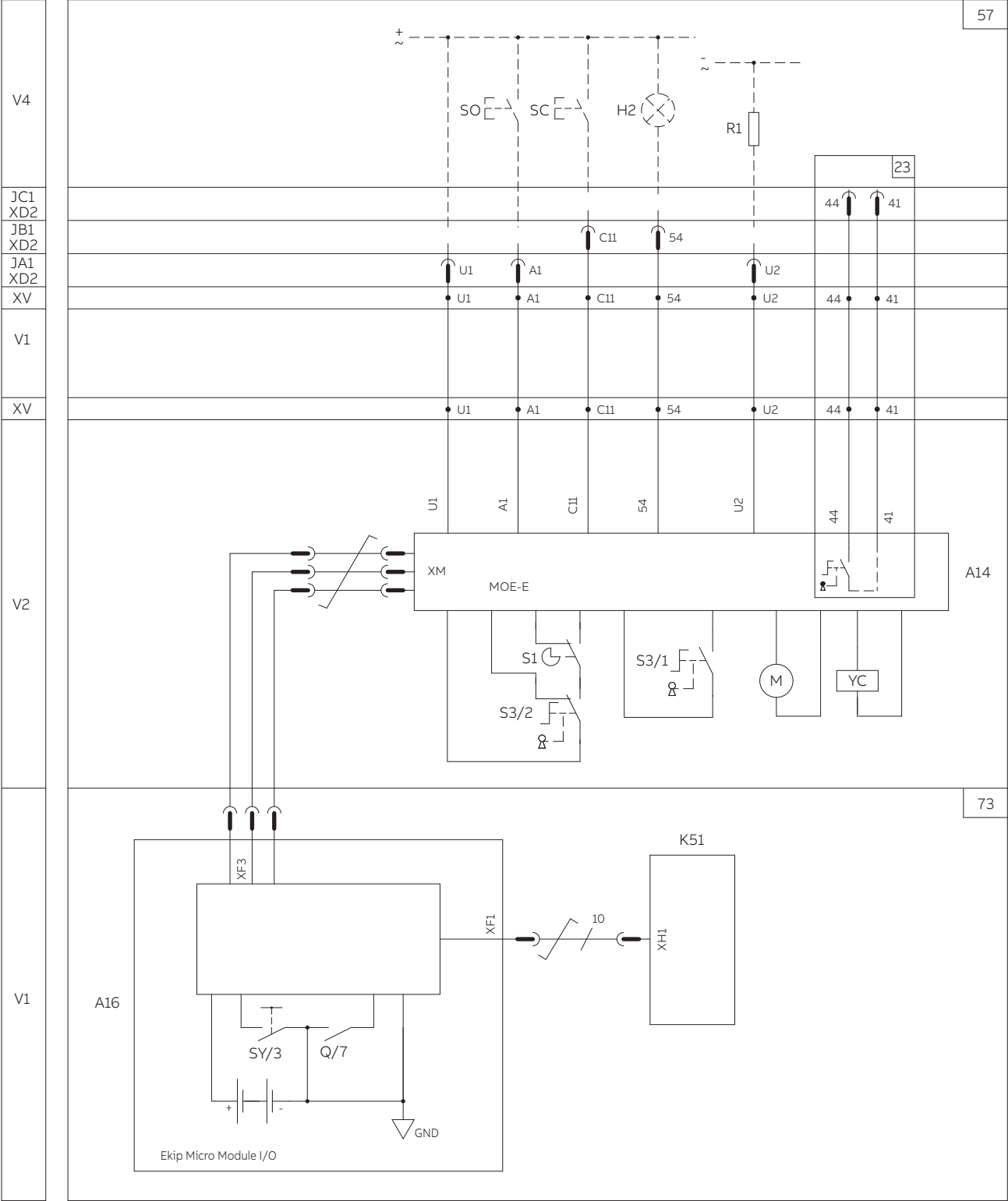
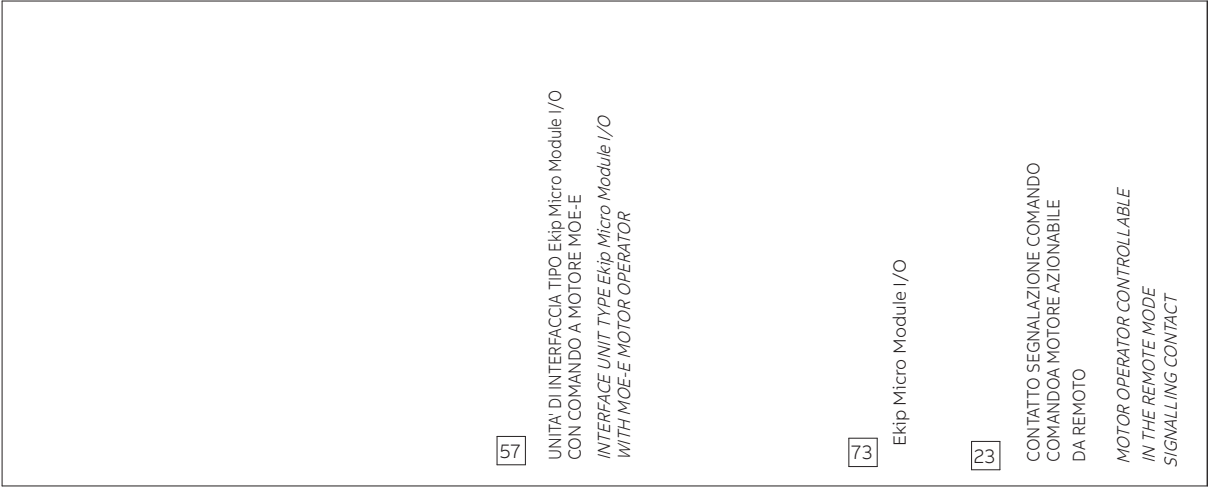
23

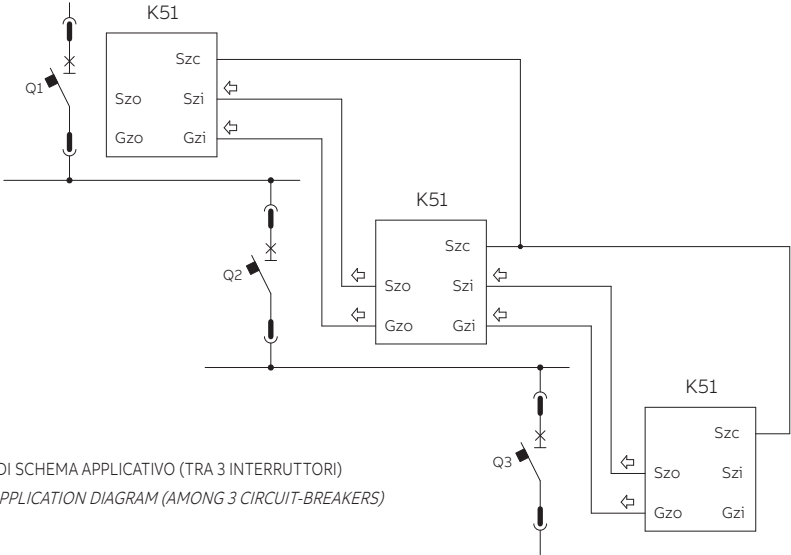
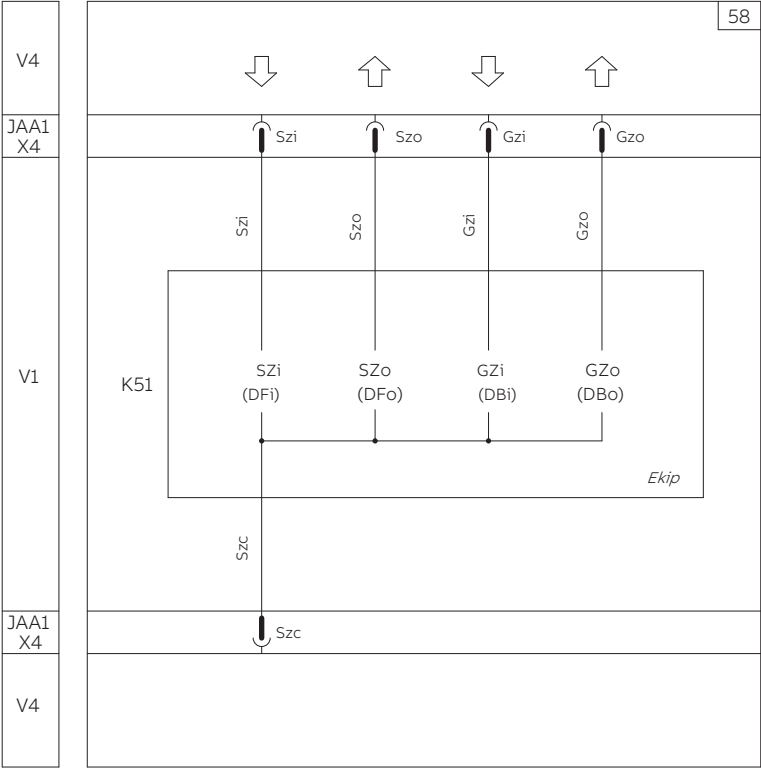
CONTATTO SEGNALE COMANDO
COMANDO MOTORE AZIONABILE
DA REMOTO

MOTOR OPERATOR CONTROLLABLE
IN THE REMOTE MODE
SIGNALLING CONTACT

56







ESEMPIO DI SCHEMA APPLICATIVO (TRA 3 INTERRUTTORI)
 EXAMPLE FOR APPLICATION DIAGRAM (AMONG 3 CIRCUIT-BREAKERS)

INTERFACCIA MODBUS RTU STA DELL'UNITA' Ekip COM
MODBUS RTU STA INTERFACE OF Ekip COM UNIT

INTERFACCIA MODBUS TCP STA DELL'UNITA' Ekip COM
MODBUS TCP STA INTERFACE OF Ekip COM UNIT

INTERFACCIA MODBUS RTU DELL'UNITA' Ekip COM
MODBUS RTU INTERFACE OF Ekip COM UNIT

INTERFACCIA DI COMUNICAZIONE DELL'UNITA' Ekip COM (VEDERE TABELLA SOTTO)
COMMUNICATION INTERFACE OF Ekip COM UNIT (SEE TABLE BELOW)

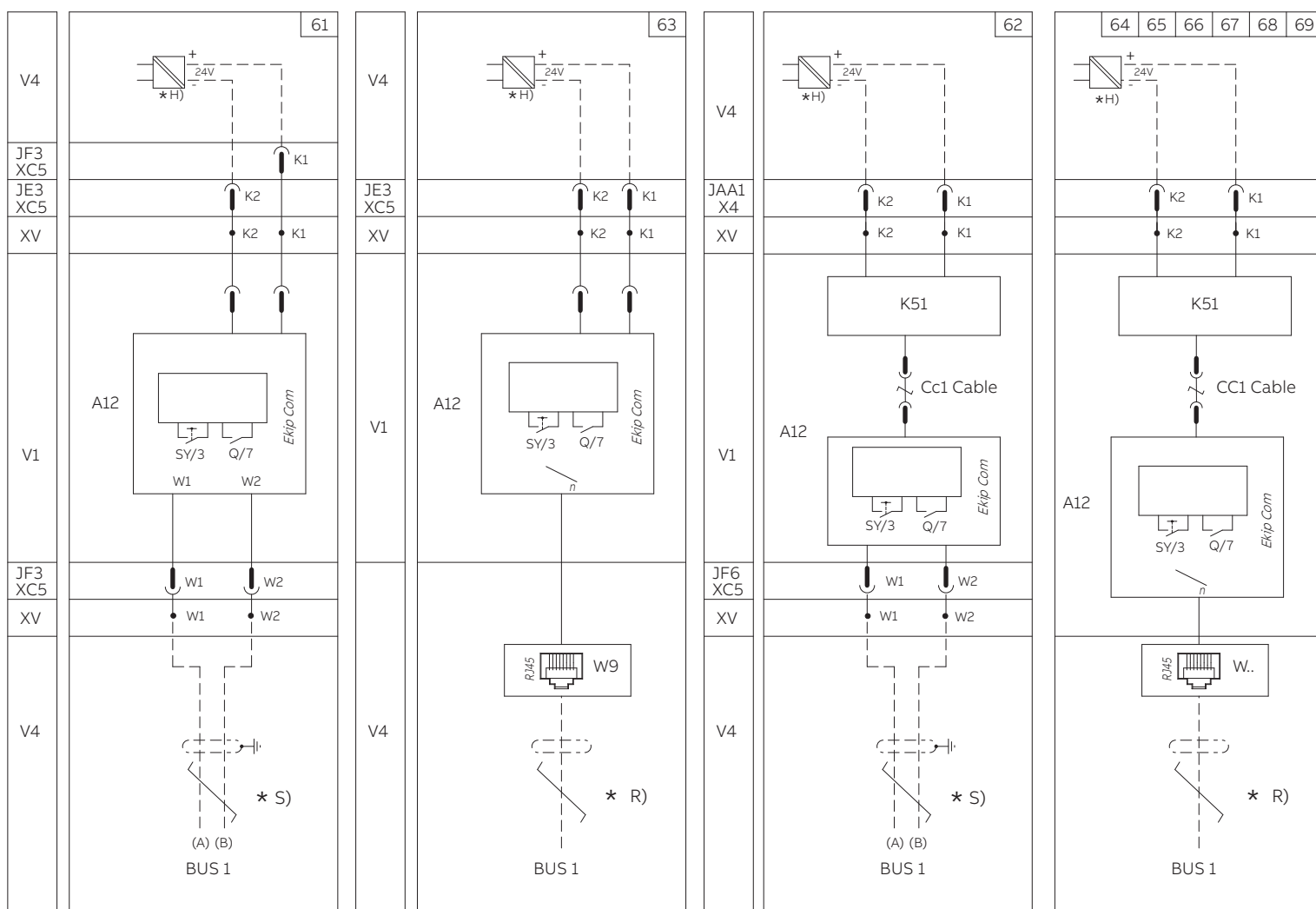
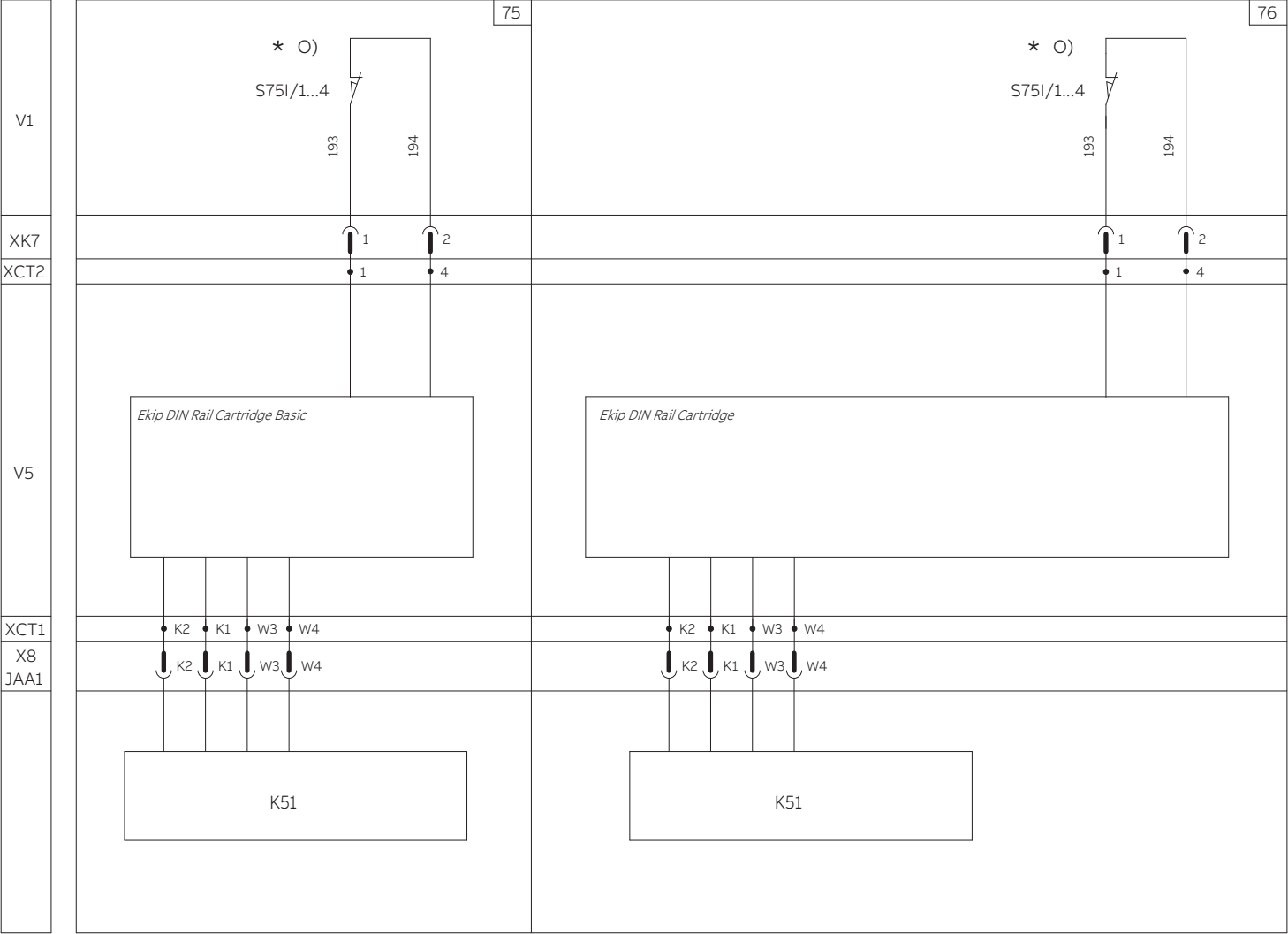
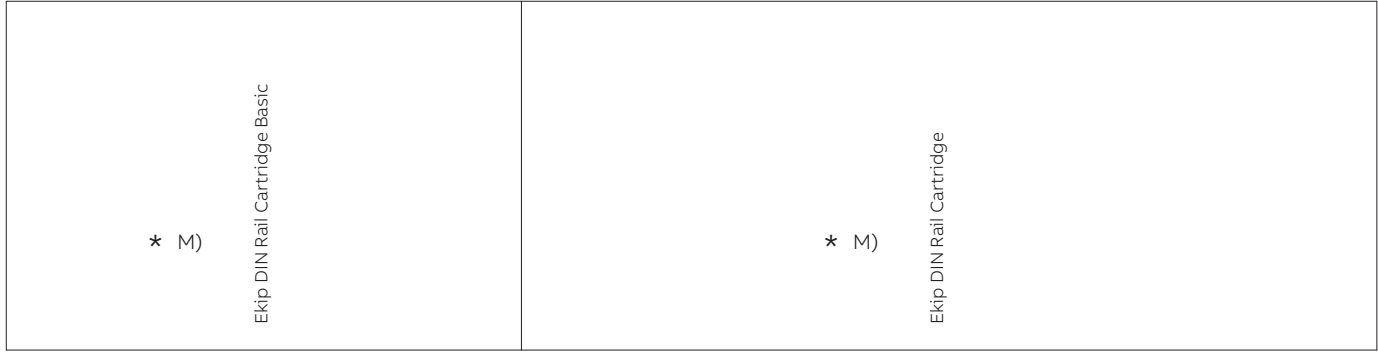
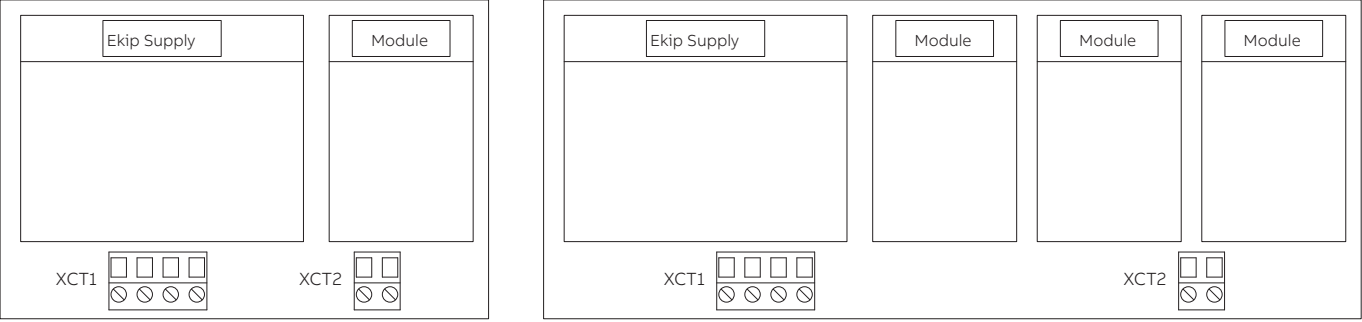


FIG.	DESCRIZIONE / DESCRIPTION	BUS
64	MODBUS TCP	W9
65	PROFINET	W10
66	ETHERNET I/P TM	W11
67	IEC61850	W12
68	LINK	W13
69	HUB	W14

IN ALTERNATIVA TRA DI LORO
AS IN ALTERNATIVE TO EACH OTHER

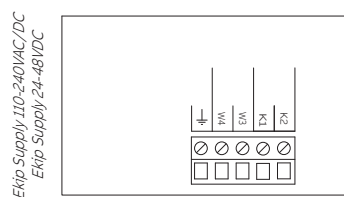


IN ALTERNATIVA TRA DI LORO
AS IN ALTERNATIVE TO EACH OTHER

Ekip DIN Rail Cartridge

— (OR) —

Ekip Supply	Module	Module	Module

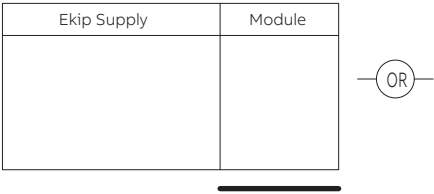


ALIMENTAZIONE AUSILIARIA
TRAMITE MODULO 110-240VAC/DC
O 24-48VDC E LOCAL BUS

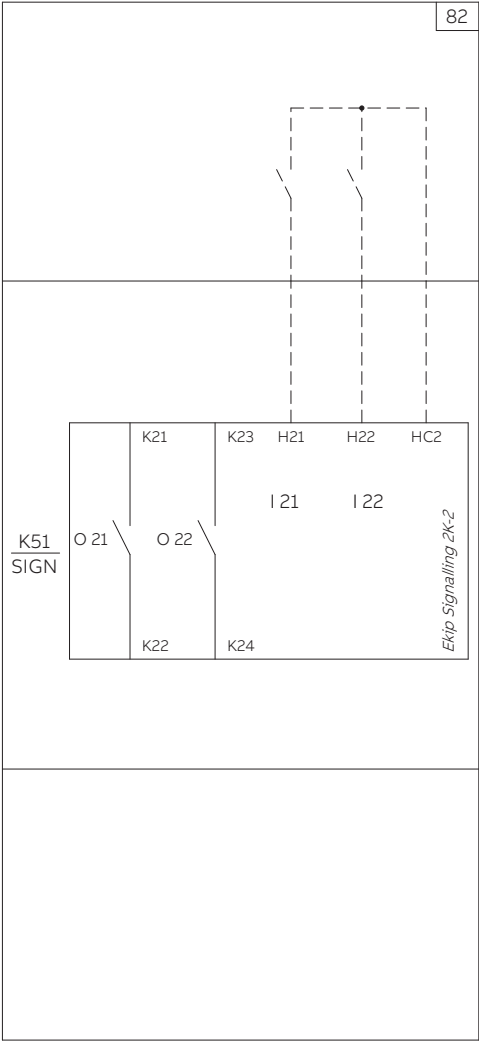
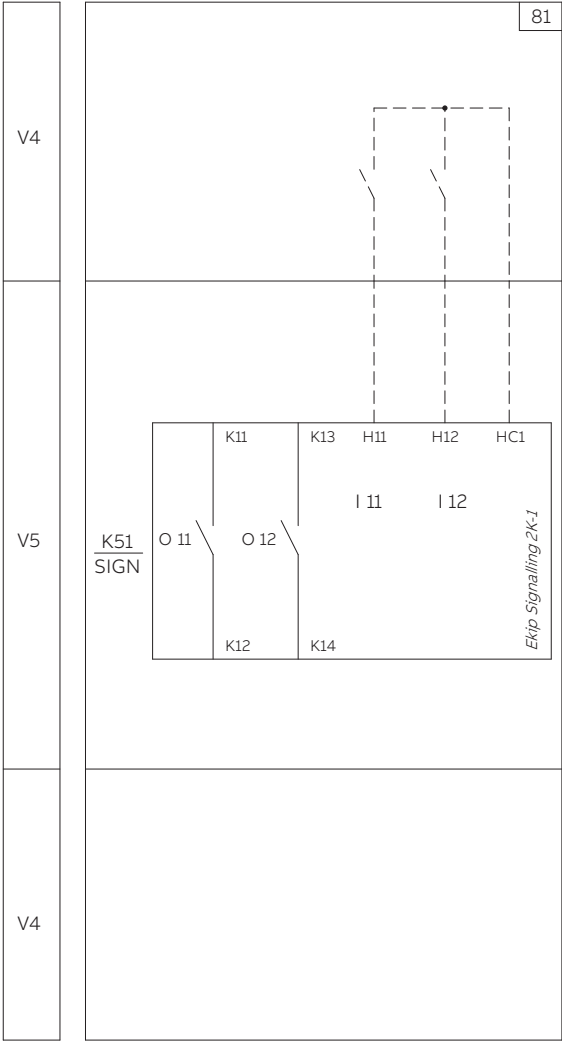
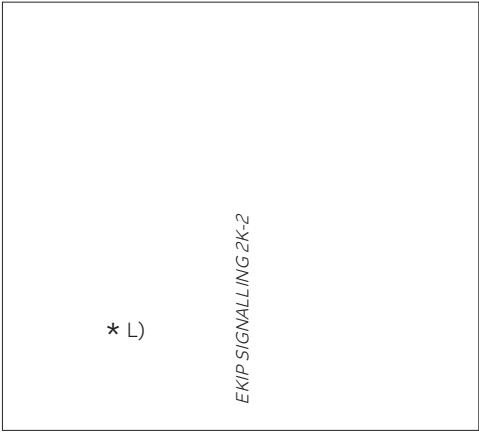
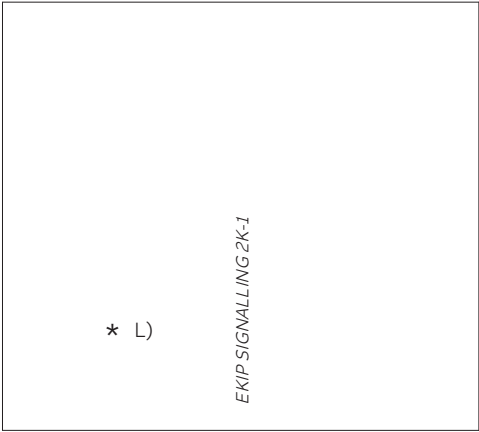
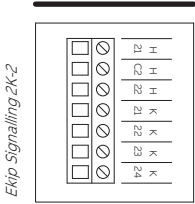
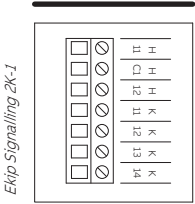
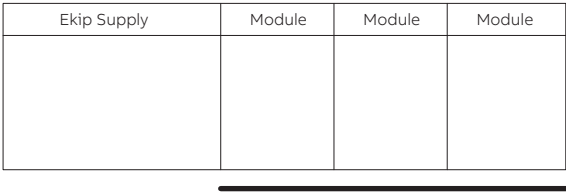


AS AN ALTERNATIVE TO FIGURE 49

Ekip DIN Rail Cartridge Basic

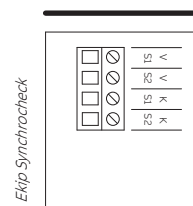
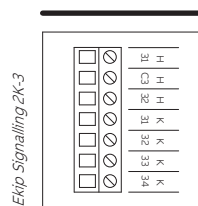


Ekip DIN Rail Cartridge



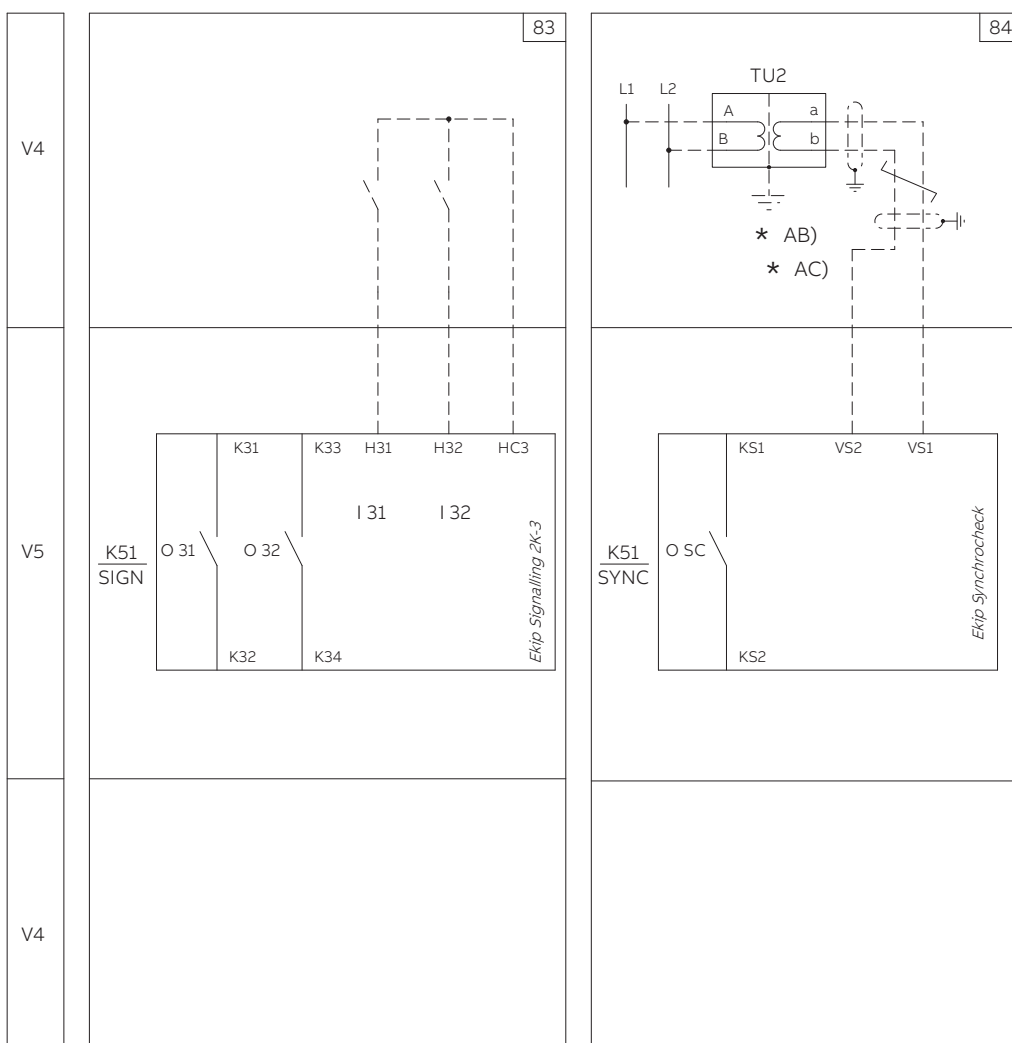
Ekip DIN Rail Cartridge

The diagram illustrates a logical OR relationship between two data structures. On the left is a table with two columns: 'Ekip Supply' and 'Module'. On the right is a table with four columns: 'Ekip Supply', 'Module', 'Module', and 'Module'. An OR gate symbol, consisting of a circle with the text 'OR' inside, is positioned between the two tables, indicating that the data from either table can be used to satisfy a condition.

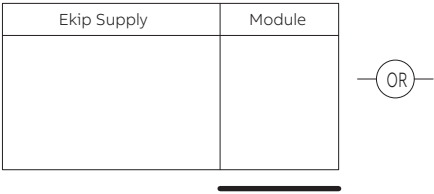


* L)

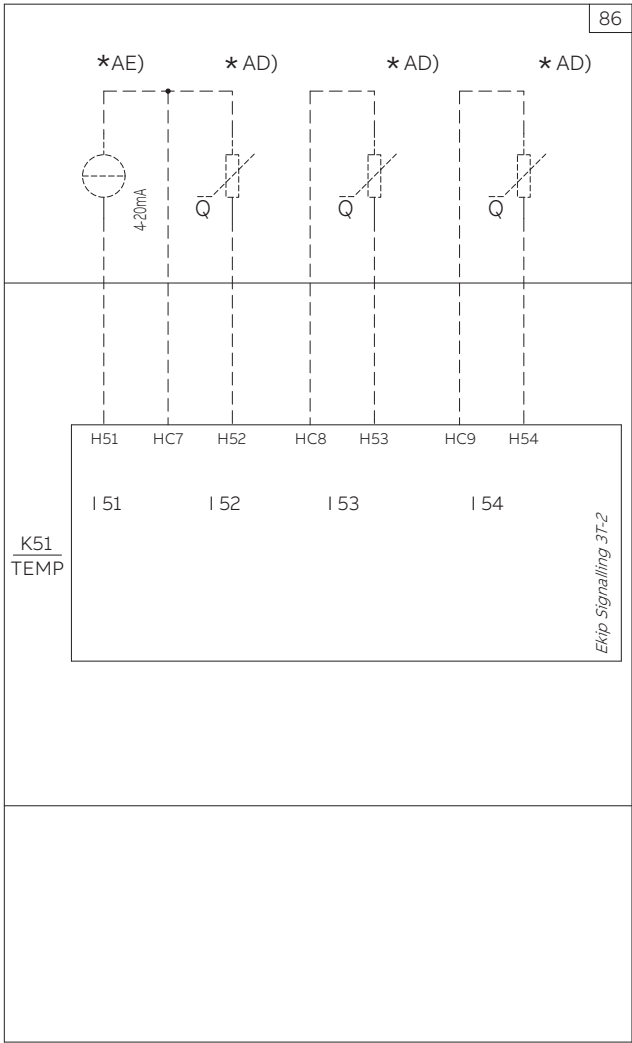
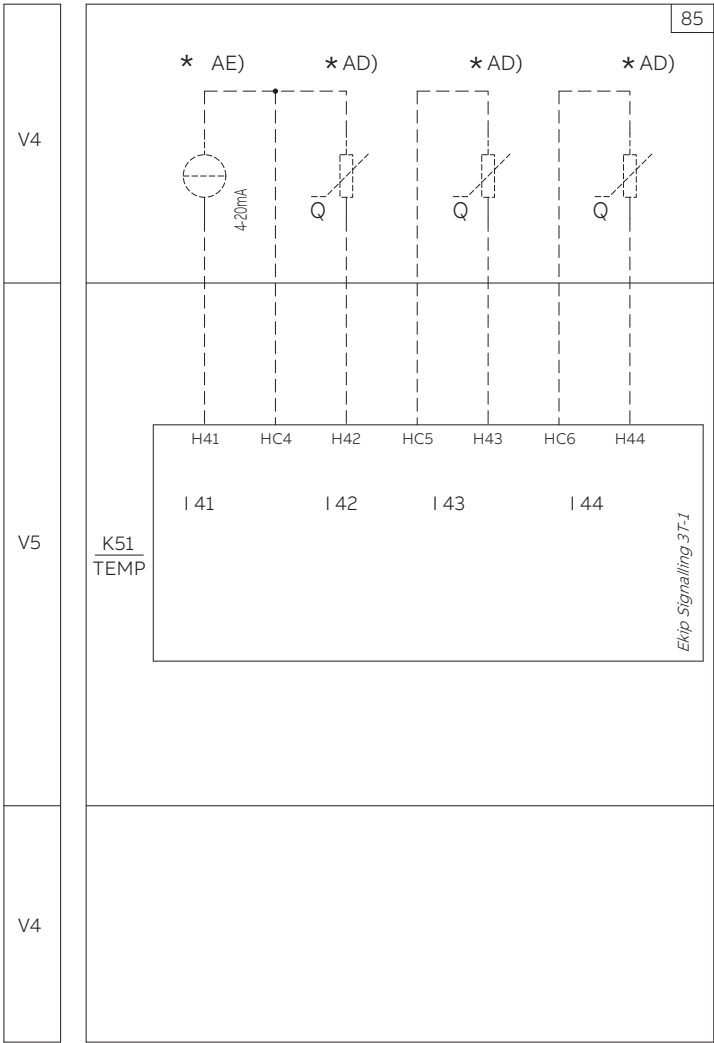
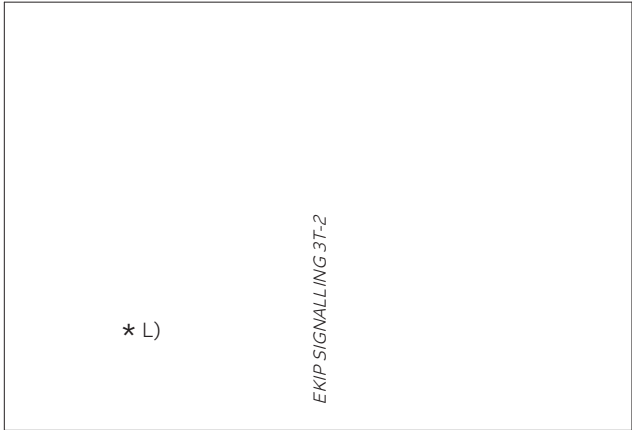
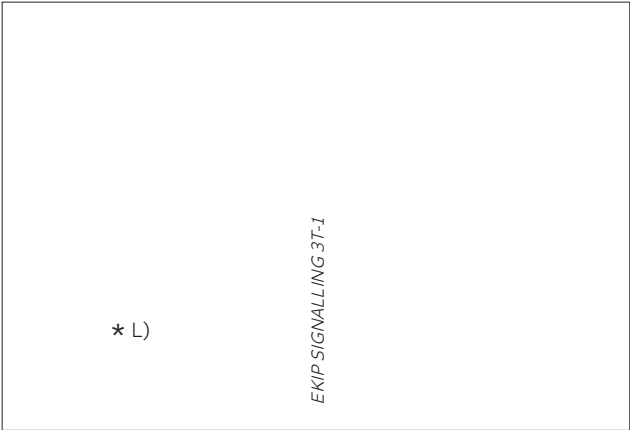
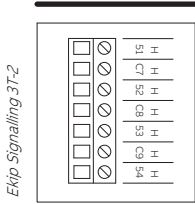
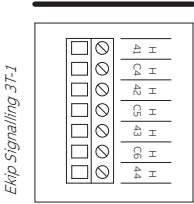
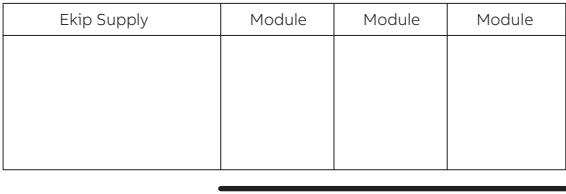
* L)



Ekip DIN Rail Cartridge Basic



Ekip DIN Rail Cartridge

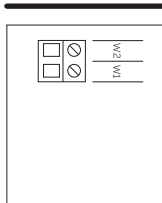


Ekip Supply	Module

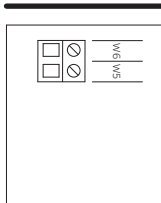
OR

Ekip Supply	Module	Module	Module

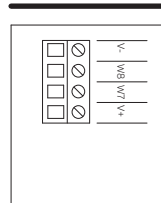
Ekip Com Modbus RTU



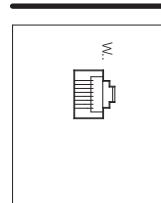
Ekip Com Profibus DP



Ekip Com DeviceNet™



Ekip Com



* L)

EKIP COM MODBUS RTU

* L)

EKIP COM PROFIBUS DP

* L)

EKIP COM DEVICENET™

* L)

EKIP COM
(VEDERE TABELLA SOTTO)
EKIP COM
(SEE TABLE BELOW)

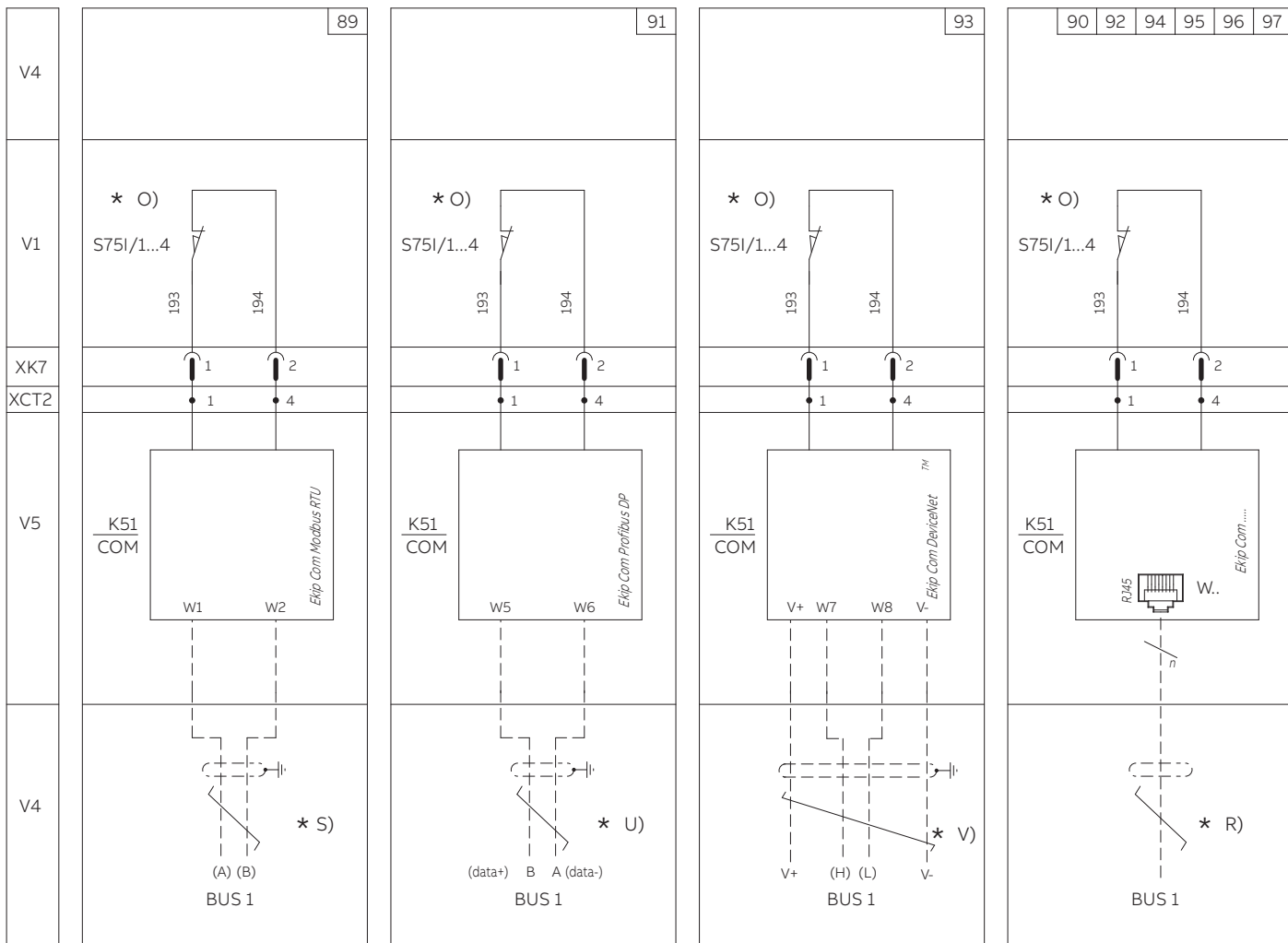
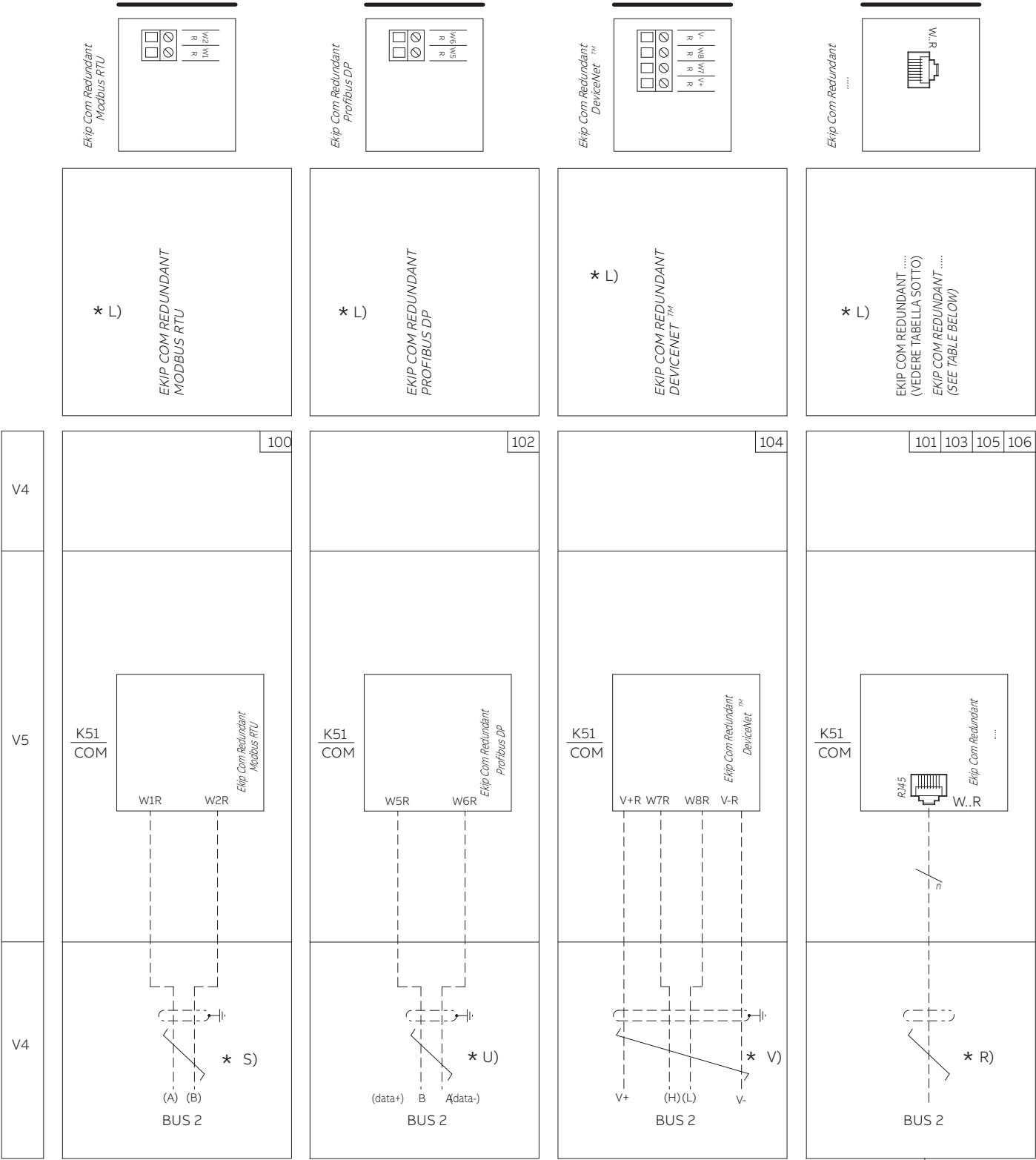


FIG.	DESCRIZIONE / DESCRIPTION	BUS
90	EKIP COM MODBUS TCP	W9
92	EKIP COM PROFINET	W10
94	EKIP COM ETHERNET I/P™	W11
95	EKIP COM IEC61850	W12
96	EKIP COM LINK	W13
97	EKIP COM HUB	W14

Ekip Supply	Module	Module	Module



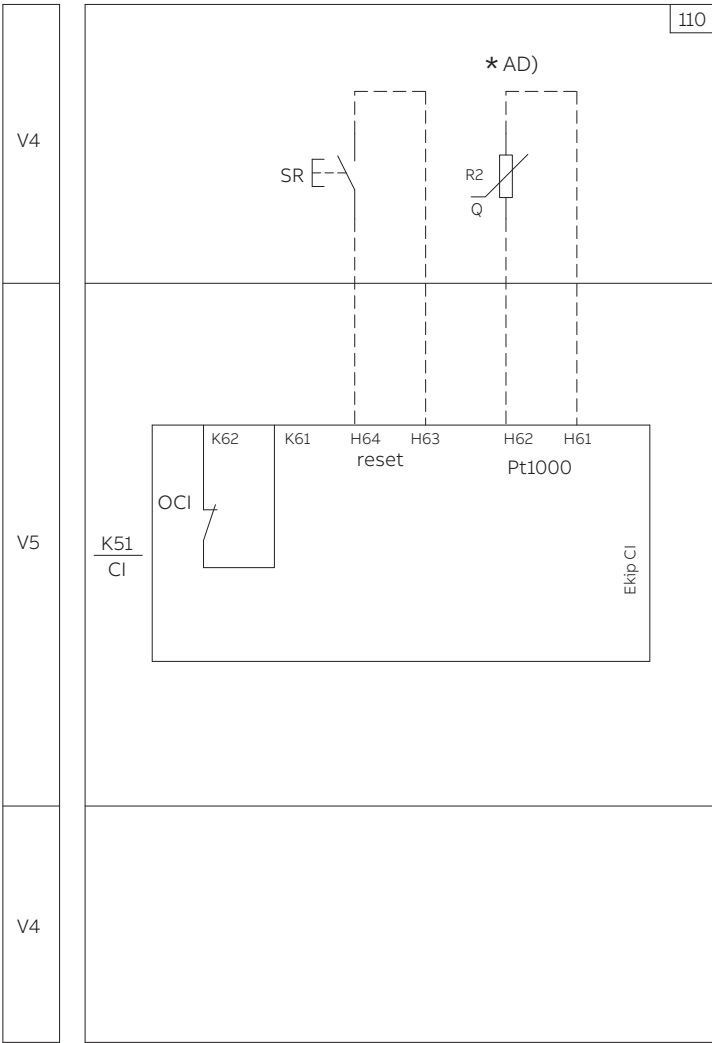
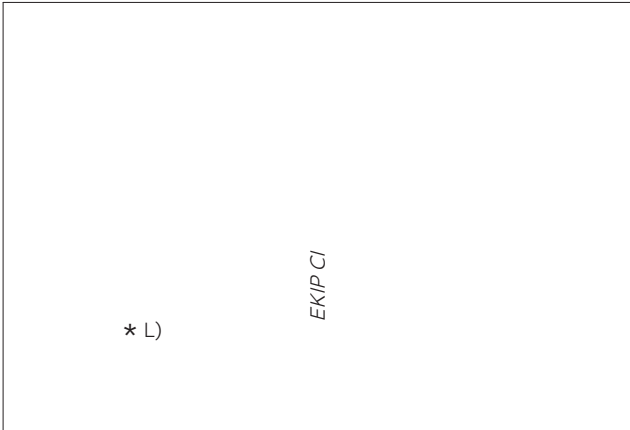
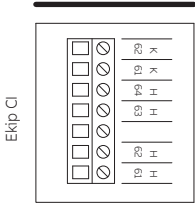
Ekip DIN Rail Cartridge Basic

Ekip Supply	Module

OR

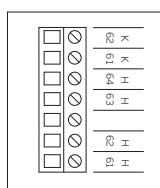
Ekip DIN Rail Cartridge

Ekip Supply	Module	Module	Module



Ekip Supply	Module

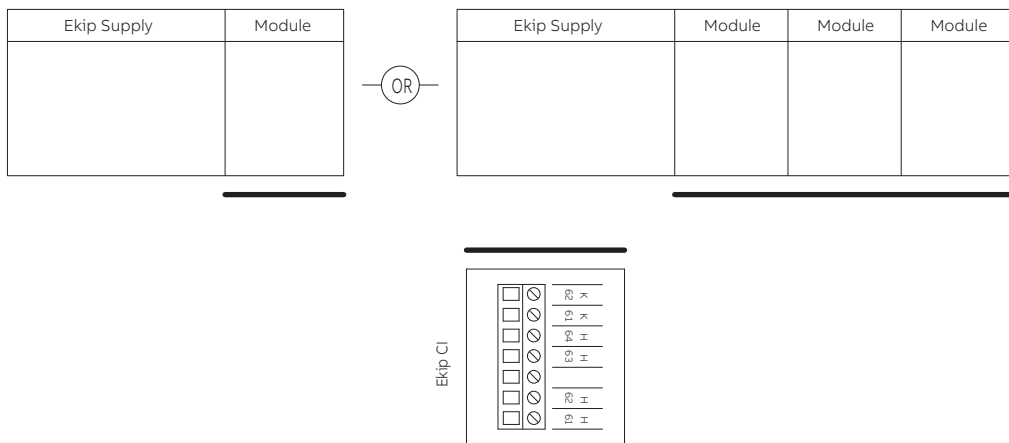
Ekip Supply	Module	Module	Module



MODULO DI AVVIAMENTO MOTORE Ekip CI
MOTOR STARTING MODULE Ekip CI



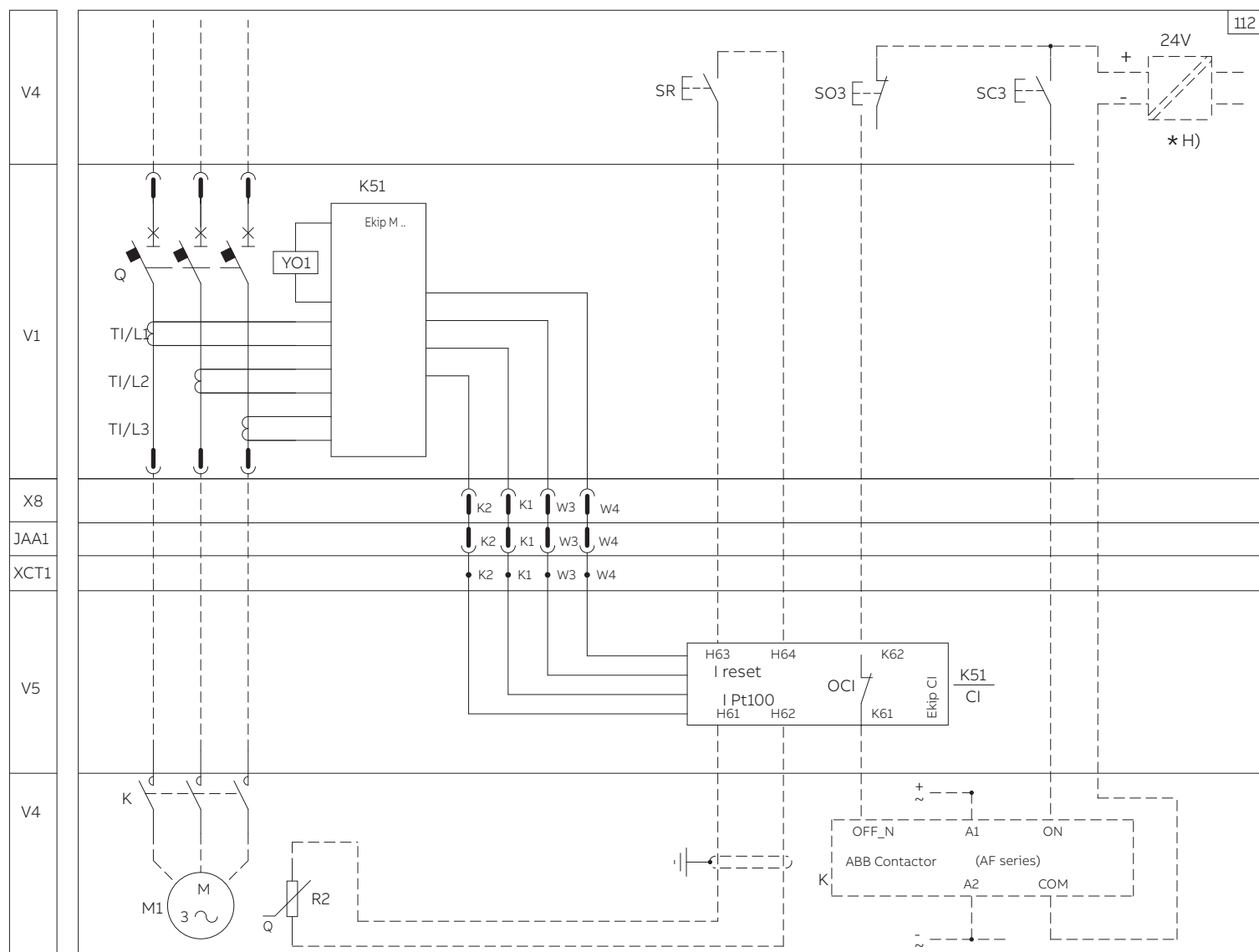
Ekip DIN Rail Cartridge



* L)

**MODULO DI AVVIAMENTO MOTORE Ekip CI
CON CONTATTORE ABB SERIE AF**

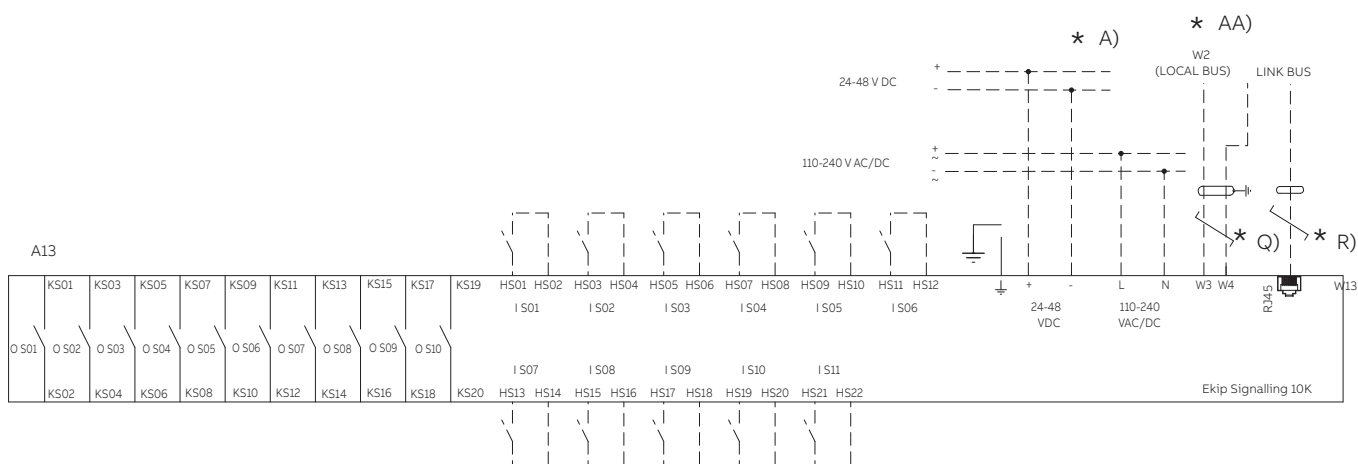
**MOTOR STARTING MODULE Ekip CI
WITH ABB CONTACTOR SERIES AF**



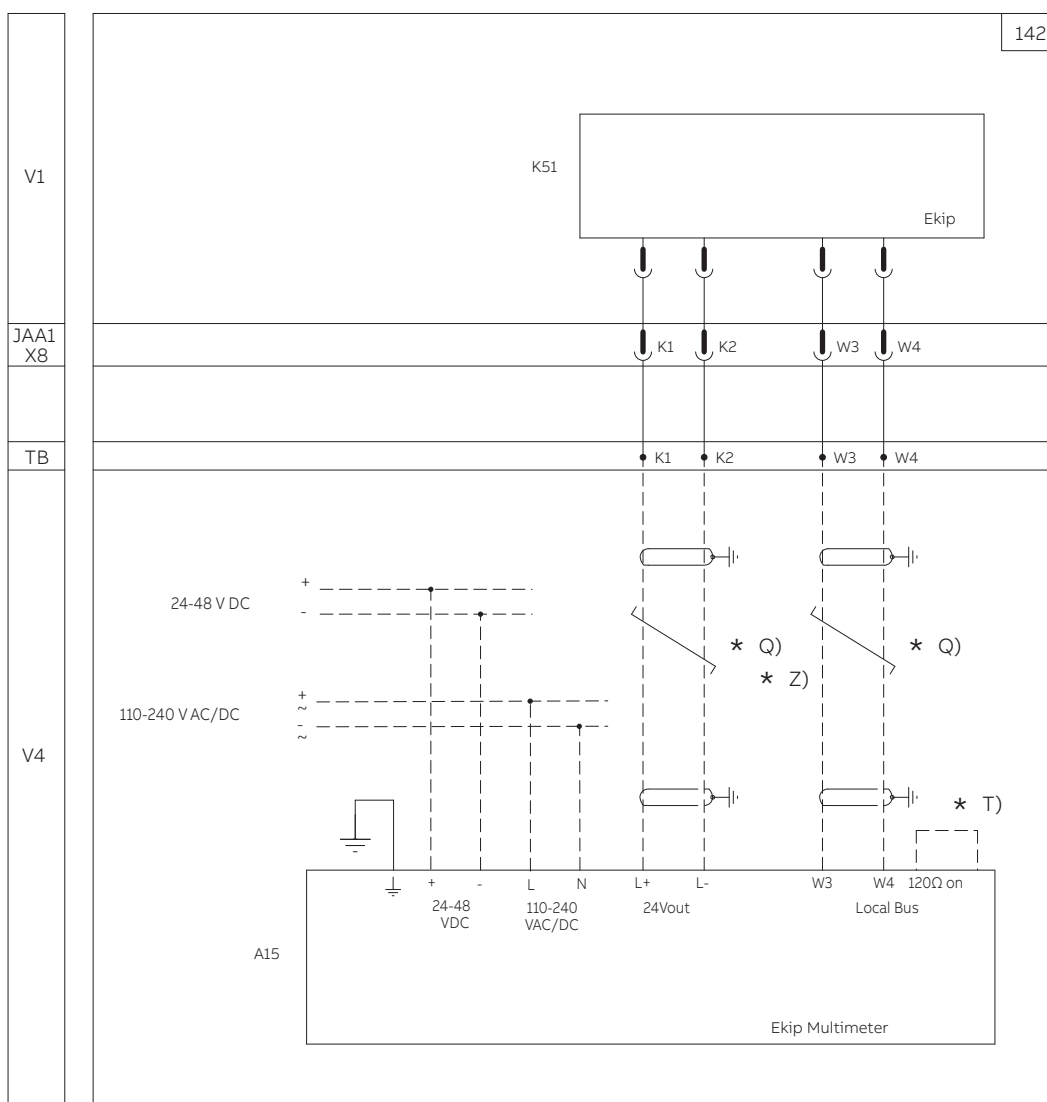
UNITA' DI SEGNALAZIONE TIPO Ekip Signalling 10K
Ekip Signalling 10K SIGNALLING UNIT

141

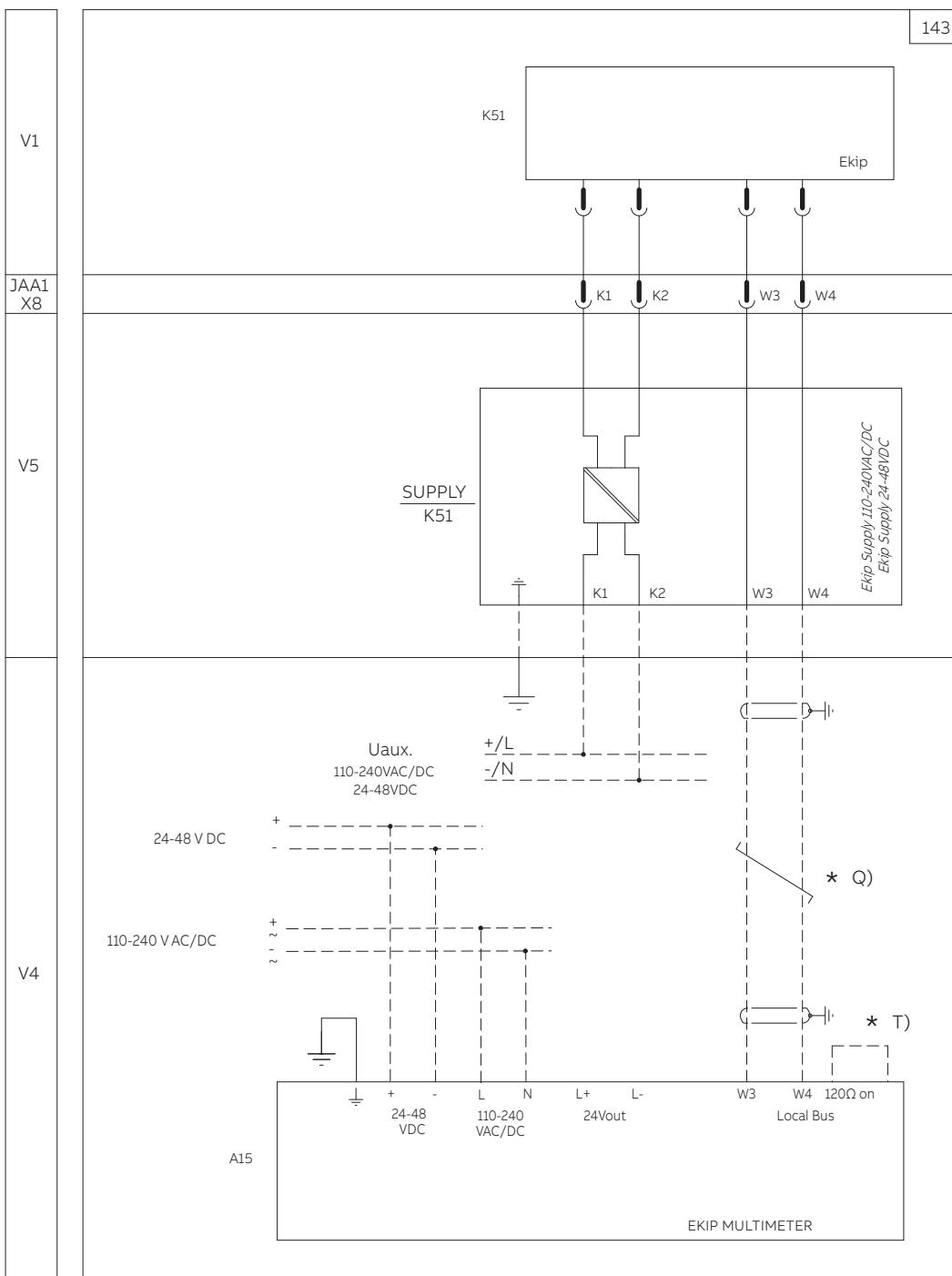
V4



UNITA MISURE TIPO Ekip Multimeter CON RELÉ CON
ALIMENTAZIONE AUSILIARIA DIRETTA 24VDC
Ekip Metering METERING UNIT WITH RELAY WITH
DIRECT AUXILIARY SUPPLY 24VDC



UNITA MISURE TIPO Ekip Multimeter CON RELE' CON ALIM.
 AUSILIARIA TRAMITE MODULO 110-240VAC/DC O 24-48VDC
 Ekip Metering UNIT WITH REALY WITH AUXILIARY
 SUPPLY THROUGH MODULE 110-240VAC/DC OR 24-48VDC



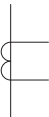
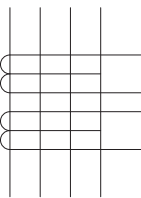
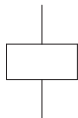
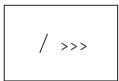
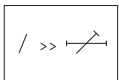
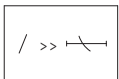
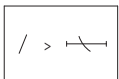
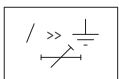
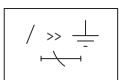
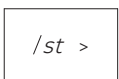
SEGNI GRAFICI PER SCHEMI ELETTRICI (NORME IEC 617 E CEI 3-14...3-26)

GRAPHICAL SYMBOLS FOR ELECTRICAL DIAGRAMS (617 IEC STANDARDS)

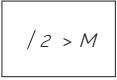
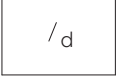
SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION	SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION
	02-08-01	-EFFETTO TERMICO -THERMAL EFFECT		02-17-06 + 02-17-07	-CONVERTITORE SEPARATO GALVANICAMENTE -CONVERTER WITH GALVANIC SEPARATOR
	02-08-02	-EFFETTO ELETTROMAGNETICO -ELECTROMAGNETIC EFFECT		03-01-03	-TRE CONDUTTORI -THREE CONNECTIONS
	02-12-01	-SCHERMO (PUO' ESSERE DISEGNATO CON QUALSIASI FORMA) -SCREEN, SHIELD (IT MAY BE DRAWN IN ANY CONVENIENT SHAPE)		03-01-07 + 03-01-09	-CONDUTTORI IN CAVO SCHERMATO (ESEMPIO: TRE CONDUTTORI) -CONDUCTORS IN A SCREENED CABLE, THREE CONDUCTORS SHOWN
	02-08-05	-TEMPORIZZAZIONE -DELAY		03-01-08	-CONDUTTORI O CAVI CORDATI (ES.: TRE CONDUTTORI) -TWISTED CONDUCTORS, THREE CONDUCTORS SHOWN
	02-12-01	-COLLEGAMENTO MECCANICO -MECHANICAL CONNECTION (LINK)		03-02-01	-CONNESSIONE DI CONDUTTORI -CONNECTION OF CONDUCTORS
	02-13-01	-COMANDO MECCANICO MANUALE (CASO GENERALE) -MANUALLY OPERATED CONTROL (GENERAL CASE)		03-02-02	-TERMINALE O MORSETTO -TERMINAL
	02-13-04	-COMANDO ROTATIVO -OPERATED BY TURNING		03-03-05	-PRESA E SPINA (FEMMINA E MASCHIO) -PLUG AND SOCKET (MALE AND FEMALE)
	02-13-05	-COMANDO A PULSANTE -OPERATED BY PUSHING		04-01-01	-RESISTORE (SEGNO GENERALE) -RESISTOR (GENERAL SYMBOL)
	02-13-13	-COMANDO A CHIAVE -OPERATED BY KEY		04-01-01 + 02-03-04	-RESISTORE VARIABILE, DIPENDENTE DALLA TEMPERATURA -VARIABLE RESISTOR, DEPENDING FROM TEMPERATURE
	02-13-16	-COMANDO A CAMMA -OPERATED BY CAM		06-03-04	-SPAZZOLA -BRUSH
	02-15-01	-TERRA (SEGNO GENERALE) -EARTH (GENERAL SYMBOL)		06-04-01	-MOTORE (SEGNO GENERALE) -MOTOR (GENERAL SYMBOL)
	02-16-01	-GENERATORE IDEALE DI CORRENTE -IDEAL CURRENT SOURCE		06-05-01	-MOTORE CON ECCITAZIONE IN SERIE -MOTOR WITH SERIES ENERGIZATION

SEGNI GRAFICI PER SCHEMI ELETTRICI (NORME IEC 617 E CEI 3-14...3-26)

GRAPHICAL SYMBOLS FOR ELECTRICAL DIAGRAMS (617 IEC STANDARDS)

SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION	SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION
	06-08-01	-MOTORE ASINCRONO TRIFASE, CON ROTORE IN CORTO CIRCUITO (A GABBIA) -INDUCTION MOTOR, THREE-PHASE, SQUIRREL CAGE		.	-CONTATTO DI CHIUSURA ANTICIPATO -EARLY MAKE CONTACT
	06-09-11	-TRASFORMATORE DI CORRENTE -CURRENT TRANSFORMER		07-13-05+ 07-01-03+ 07-01-05	-INTERRUTTORE DI POTENZA-SEZIONATORE AD APERTURA AUTOMATICA -CIRCUIT BREAKER-DISCONNECTOR WITH AUTOMATIC RELEASE
	06-13-01	-TRASFORMATORE DI TENSIONE -VOLTAGE TRANSFORMER		07-13-02	-CONTATTORE (CONTATTO DI CHIUSURA) -CONTACTOR (CONTACT OPEN IN THE UNOPERATED POSITION)
	06-13-11 + 06-13-07	-TRASFORMATORE DI CORRENTE CON PRIMARIO COSTITUITO DA 4 CONDUTTORI PASSANTI E CON SECONDARIO AVVOLTO, CON PRESA -CURRENT TRANSFORMER WITH FOUR THREADED WINDINGS AND WITH ONE PERMANENT WINDING WITH ONE TAPPING		07-13-08	-INTERRUTTORE DI MANOVRA-SEZIONATORE -SWITCH-DISCONNECTOR (ON-LOAD ISOLATING SWITCH)
				07-15-01	-BOBINA DI COMANDO (SEGNO GENERALE) -OPERATING DEVICE (GENERAL SYMBOL)
	06-15-01	-PRIMARY CELL, SECONDARY CELL, BATTERY OF PRIMARY OR SECONDARY CELLS -ELEMENTO DI PILA, ELEMENTO DI ACCUMULATORE, BATTERIA DI PILE O DI ACCUMULATORI		(07-16-01)	-RELÉ DI MASSIMA CORRENTE ISTANTANEO -INSTANTANEOUS OVERCURRENT OR RATE-OF-RISE RELAY
	07-02-01	-CONTATTO DI CHIUSURA -MAKE CONTACT		(07-16-01)	-RELÉ DI MASSIMA CORRENTE CON CARATTERISTICA DI RITARDO A TEMPO BREVE REGOLABILE -OVERCURRENT RELAY WITH ADJUSTABLE SHORT TIME- LAG CHARACTERISTIC
	07-02-03	-CONTATTO DI APERTURA -BREAK CONTACT		(07-16-01)	-RELÉ DI MASSIMA CORRENTE CON CARATTERISTICA DI RITARDO A TEMPO BREVE INVERSO -OVERCURRENT RELAY WITH INVERSE SHORT TIME-LAG CHARACTERISTIC
	07-02-04	-CONTATTO DI SCAMBIO CON INTERRUZIONE MOMEN- TANEA -CHANGE-OVER BREAK BEFORE MAKE CONTACT		(07-16-01)	-RELÉ DI MASSIMA CORRENTE CON CARATTERISTICA DI RITARDO A TEMPO LUNGO INVERSO -OVERCURRENT RELAY WITH INVERSE LONG TIME-LAG CHARACTERISTIC
	07-08-01	-CONTATTO DI POSIZIONE DI CHIUSURA (FINE CORSA) -POSITION SWITCH (LIMIT SWITCH), MAKE CONTACT		(07-16-01)	-RELÉ DI MASSIMA CORRENTE PER GUASTO A TERRA CON CARATTERISTICA DI RITARDO A TEMPO BREVE REGOLABILE -EARTH FAULT OVERCURRENT RELAY WITH ADJUSTABLE SHORT TIME-LAG CHARACTERISTIC
	07-08-02	-CONTATTO DI POSIZIONE DI APERTURA (FINE CORSA) -POSITION SWITCH (LIMIT SWITCH), BREAK CONTACT		(07-16-01)	-RELÉ DI MASSIMA CORRENTE PER GUASTO A TERRA CON CARATTERISTICA A TEMPO BREVE INVERSO -EARTH FAULT OVERCURRENT RELAY WITH INVERSE SHORT TIME-LAG CHARACTERISTIC
	.	-CONTATTO DI POSIZIONE DI SCAMBIO CON INTERRUZIONE MOMENTANEA (FINE CORSA) -POSITION SWITCH (LIMIT SWITCH) CHANGE-OVER BREAK BEFORE MAKE CONTACT		(07-16-01)	-RELÉ DI PROTEZIONE ROTORE BLOCCATO -ROTOR BLOCKAGE PROTECTION RELAY

SEGNi GRAFICI PER SCHEMI ELETTRICI (NORME IEC 617 E CEI 3-14...3-26)
GRAPHICAL SYMBOLS FOR ELECTRICAL DIAGRAMS (617 IEC STANDARDS)

SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION	SEGNO SYMBOL	IEC 617	LEGENDA DESCRIPTION
	(07-16-01)	-RELÉ DI PROTEZIONE PERDITA E/O SQUILIBRIO DI FASE PER MOTORE -MOTOR PHASE LOSS AND/OR UNBALANCE PROTECTION RELAY			
	(07-16-01)	-RELÉ DI PROTEZIONE DIFFERENZIALE DI CORRENTE -DIFFERENTIAL CURRENT PROTECTION RELAY			
	08-10-01	-LAMPADA, SEGNO GENERALE -LAMP, GENERAL SYMBOL			

STATO DI FUNZIONAMENTO RAPPRESENTATO

Lo schema è rappresentato nelle seguenti condizioni:

- interruttore in esecuzione estraibile o rimovibile aperto e inserito
- contattore per l'avviamento del motore aperto
- circuiti in assenza di tensione
- sganciatori non intervenuti

LEGENDA

* = Vedere la nota indicata dalla lettera

A12 = Unità di interfaccia tipo Ekip Com

A13 = Unità di segnalazione tipo Ekip Signalling 10K

A14 = Unità di attuazione tipo MOE-E per il comando a motore ad accumulo di energia

A15 = Unità misure tipo Ekip Multimeter

A16 = Unità di interfaccia tipo Ekip Micro Module I/O

A17 = Unità di attuazione tipo MOE per il comando a motore ad accumulo di energia

BUS1 = Interfaccia seriale con il bus esterno

BUS2 = Interfaccia seriale ridondante con il bus esterno

LINK BUS = Interfaccia con il Link bus esterno

D = Ritardatore elettronico della bobina di minima tensione YU, esterno all'interruttore (solo per tensioni fino a 250V)

H2 = Lampada di segnalazione per comando a motore ad accumulo di energia bloccato

I 11...32 = Ingressi digitali programmabili

I 41...43 51...53 = Ingressi analogici da sensore di temperatura

I 44-54 = Ingressi analogici da sensore 4-20mA

I Pt100 = Ingresso analogico da sensore di temperatura Pt100 del motore

I reset = Ingresso digitale per il reset dello sgancio dell'unità di comando contattore di avviamento motore

J... = Connettori per i circuiti ausiliari dell'interruttore in esecuzione estraibile, l'estrazione dei connettori avviene contemporaneamente a quella dell'interruttore

K = Contattore per l'avviamento del motore

K51 = Relè elettronico di protezione di massima corrente tipo Ekip

K51/CI = Modulo di comando contattore per l'avviamento del motore

K51/COM = Modulo comunicazione

K51/MEAS = Modulo misure

K51/SIGN = Modulo di segnalazione

K51/SUPPLY = Modulo alimentazione ausiliaria (110-240VAC/DC e 24-48VDC)

K51/SYNC = Modulo sincronizzazione

K51/TEMP = Modulo di controllo temperatura

K87 = Relè differenziale

M = Motore con eccitazione in serie per l'apertura e la chiusura dell'interruttore (Fig. 21)

M = Motore per l'apertura dell'interruttore e la carica delle molle di chiusura (Fig. 22-54-55-56-57)

M1 = Motore asincrono trifase

O 11...32 = Contatti di segnalazione programmabili

OCI = Contatto per il comando del contattore di avviamento motore

O SC = Contatto per il controllo di sincronismo

Q = Interruttore principale

Q/0...7 = Contatti ausiliari aperto/chiuso dell'interruttore

R-R1 = Resistore

R2 = Sensore di temperatura Pt100 del motore

S1 = Contatto comandato dalla camma del comando a motore

S2 = Contatto comandato dal blocco a chiave del comando a motore ad azione diretta

S3/1-2 = Contatti comandati dal selettore Auto/Manual a dal blocco a chiave del comando a motore

ad accumulo di energia

- S4 = Contatto comandato dalla camma del comando a motore ad azione diretta
- S4/1-2 = Contatti ausiliari anticipati azionati dalla maniglia rotante dell'interruttore
- S51 = Contatto di segnalazione di interruttore aperto per intervento dello sganciatore di protezione di massima corrente termomagnetico o del relè elettronico
- S6/1-2 = Contatti comandati dal selettore Auto/Manual del comando a motore ad azione diretta
- S75E/1-2 = Contatti per la segnalazione di interruttore in posizione di estratto (previsti solo con interruttori in esecuzione estraibile)
- S75I/1-2-5 = Contatti per la segnalazione di interruttore in posizione di inserito (previsti solo con interruttori in esecuzione rimovibile o estraibile)
- S87/1 = Contatto per la segnalazione elettrica di preallarme del relè differenziale
- S87/2 = Contatto per la segnalazione elettrica di allarme del relè differenziale
- S87/3 = Contatto per la segnalazione elettrica di interruttore aperto per intervento del relè differenziale
- SC = Pulsante o contatto per la chiusura dell'interruttore
- SC3 = Pulsante per l'avviamento del motore
- SD = Sezionatore dell'alimentazione del relè differenziale
- SO = Pulsante o contatto per l'apertura dell'interruttore
- SO3 = Pulsante per l'arresto del motore
- SR = Pulsante o contatto di reset elettrico
- SY/1...3 = Contatti di segnalazione di interruttore aperto per intervento del relè di protezione di massima corrente, dello sganciatore termomagnetico e delle bobine YO, YO1, YO2, YU (posizione di scattato)
- TI = Trasformatore di corrente toroidale
- TI/L1-L2-L3 = Trasformatore di corrente fase L1-L2-L3
- TI/N = Trasformatore di corrente sul neutro
- TU2 = Trasformatore di tensione di isolamento (esterno all'interruttore)
- Uaux = Tensione di alimentazione ausiliaria
- V1 = Applicazioni dell'interruttore
- V2 = Applicazioni del comando a motore
- V4 = Apparecchi e collegamenti indicativi per comando e segnalazione, esterni all'interruttore
- V5 = Applicazioni della cartuccia Ekip DIN Rail Cartridge Basic o Ekip DIN Rail Cartridge
- W2 = Interfaccia seriale con il bus interno (bus locale)
- W9...14 = Connettore RJ45 per unità di interfaccia e per moduli comunicazione
- W9R...12R = Connettore RJ45 per moduli comunicazione ridondanti
- X3-X4-X8 = Connettori del relè di protezione
- X41 = Connettore del circuito amperometrico per neutro esterno
- XB.. = Connettore a tre vie per i circuiti ausiliari dell'interruttore in esecuzione rimovibile
- XC.. = Connettore a sei vie per i circuiti ausiliari dell'interruttore in esecuzione rimovibile
- XC2-3 = Connettore a sei vie per i circuiti ausiliari dell'interruttore in esecuzione rimovibile per tensioni fino a 400V
- XCT1-2 = Morsettiera della cartuccia Ekip DIN Rail Cartridge Basic o Ekip DIN Rail Cartridge
- XD.. = Connettore a nove vie per i circuiti ausiliari dell'interruttore in esecuzione rimovibile
- XE.. = Connettore a quindici vie per i circuiti ausiliari dell'interruttore in esecuzione rimovibile
- XF.. = Connettore dell'unità di interfaccia tipo Ekip Com
- XG = Connettore del relè di protezione
- XH1 = Connettore del relè di protezione
- XK7 = Connettore del contatto S75I/5
- XM = Connettore dell'unità di attuazione tipo MOE-E
- XV = Morsettiera delle applicazioni dell'interruttore
- YC = Bobina di chiusura del comando a motore a accumulo di energia
- YO = Bobina di apertura
- YO1 = Bobina di apertura per massima corrente

YO2 = Bobina di apertura del relè differenziale

YU = Bobina di minima tensione

NOTE

- A. Per le funzioni di selettività di zona e di local bus è necessaria la presenza di alimentazione ausiliaria (vedere Fig. 51-81).
- B. La bobina di minima tensione viene fornita per alimentazione derivata a monte dell'interruttore o da una sorgente indipendente: è permessa la chiusura dell'interruttore solo a bobina eccitata (il blocco della chiusura è realizzato meccanicamente).
- C. I contatti S4/1 e S4/2 di Fig. 7-8 aprono il circuito ad interruttore aperto e lo richiudono quando viene realizzato un comando di chiusura manuale mediante maniglia rotante, in accordo alle Norme relative alle macchine utensili (la chiusura non avviene comunque se la bobina di minima tensione non è alimentata).
- E. Nel caso in cui si desideri installare contemporaneamente l'applicazione di Fig. 21 ed i contatti di Fig. 31, il contatto Q/2 dovrà essere installato nella cava adiacente (contrassegnata da Q/1).
- F. R= Resistore esterno addizionale per minima tensione alimentata a 380/440Vca e 480/525Vca.
R1= Resistore esterno addizionale per comando a motore ad accumulo di energia o comando a motore ad azione diretta alimentati a 480/525Vca.
- G. Nel caso di interruttore tripolare in esecuzione fissa con trasformatore di corrente su conduttore neutro esterno all'interruttore, quando si vuole rimuovere l'interruttore è necessario cortocircuitare i morsetti del trasformatore TI/N.
- H. Essendo richiesta una Uaux isolata da terra è necessario utilizzare "convertitori galvanicamente separati" conformi alle norme IEC 60950 (UL 1950) o sue equivalenti.
- I. Obbligatorio in caso di presenza di qualsiasi modulo Ekip.
- L. In caso di cartucciera Ekip DIN Rail Cartridge Basic può essere fornita una sola applicazione tra le Fig. 80...110.
In caso di cartucciera Ekip DIN Rail Cartridge possono essere fornite fino a tre applicazioni tra le Fig. 80...110 prese una sola volta. E' possibile inoltre duplicare il modulo Ekip Com eventualmente selezionato scegliendo tra le Fig. 100...106.
- M. Per il corretto funzionamento deve essere sempre presente almeno un modulo.
- N. Devono essere usati cavi tipo BELDEN 3105A o equivalente.
- O. In presenza di più moduli Ekip Com con interruttori in esecuzione rimovibile o estraibile, uno dei contatti S75I/1...4 va collegato una volta sola su un solo modulo.
- P. La tensione ausiliaria Uaux. consente l'attivazione della totalità delle funzionalità dei relè di protezione elettronici EKIP. Essendo richiesta una Uaux isolata da terra è necessario utilizzare "convertitori galvanicamente separati" conformi alle norme IEC 60950 (UL 1950) o sue equivalenti.
- Q. Devono essere usati cavi tipo BELDEN 3105A o equivalente, con lunghezza massima di 15m.
- R. Cavo RJ45 suggerito: CAT6 STP.
- S. Per il collegamento della linea seriale EIA RS485 vedere il "Quaderno Applicazione Tecnica - vol. 9: La Comunicazione via BUS con gli interruttori ABB".
- T. Cortocircuitare i morsetti 120Ω on se si vuole inserire un resistenza di terminazione sul Local Bus.
- U. Usare cavi Belden tipo 3079A o equivalente. Per ulteriori dettagli vedere il White Paper 1SDC007412G0201 "Comunicazione con interruttore SACE Emax 2".
- V. Usare cavi Belden tipo 3084A o equivalente. Per ulteriori dettagli vedere il White Paper 1SDC007412G0201 "Comunicazione con interruttore SACE Emax 2".
- Z. Per alimentazione al relè elettronico tramite i morsetti K1 e K2 non è possibile utilizzare Ekip Supply.
- AA. Per la connessione di W3 e W4 vedere Fig. 51 o 81.
- AB. Utilizzare cavo bipolare e schermato tipo BELDEN 8762/8772 o equivalente. Lo schema va collegato a terra lato ingresso di selettività (per selettività di zona) o ambo i lati (per altre applicazioni).

Possono essere fornite le applicazioni indicate nelle figure 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-34-36-39.

Possono essere fornite le applicazioni indicate nelle figure 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-34-36-39-41-42-43-44.

[illegible]

Possono essere fornite le applicazioni indicate nelle figure 1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-34-36-39(3p)-39(4p).

Possono essere fornite le applicazioni indicate nelle figure 1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-34-36-39(3p)-39(4p)-41-42-43-44.

[illegible]

Possono essere fornite le applicazioni indicate nelle figure 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-47-57-61-62-63-64-65-66-67-68-69-75-76.

Possono essere fornite le applicazioni indicate nelle figure 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

Possono essere fornite le applicazioni indicate nelle figure 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

Possono essere fornite le applicazioni indicate nelle figure 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-58-61-62-63-64-65-66-67-68-69-75-76.

Possono essere fornite le applicazioni indicate nelle figure 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-41-42-43-44-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

Possono essere fornite le applicazioni indicate nelle figure 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

Possono essere fornite le applicazioni indicate nelle figure 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

Possono essere fornite le applicazioni indicate nelle figure 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-

66-67-68-69-75-76.

La seguente tabella indica incompatibilità tra le varie applicazioni (X= applicazioni incompatibili):

[illegible]

OPERATING STATE SHOWN

The diagram illustrates the components in the following conditions:

- withdrawable or plug-in version of circuit-breaker, open and racked-in
- motor starting contactor open
- circuits de-energized
- releases not tripped

KEY

* = See note indicated by the letter

A12 = Ekip Com type interface unit

A13 = Ekip Signaling 10K type signaling unit

A14 = MOE-E type stored energy motor operator actuating unit

A15 = Ekip Multimeter type measurement unit

A16 = Ekip Micro Module I/O type interface unit

A17 = MOE type stored energy motor operator actuating unit

BUS1 = Serial interface with external bus

BUS2 = Redundant serial interface with external bus

LINK BUS = Interface with external Link bus

D = Electronic time-delay device for undervoltage release coil YU, outside circuit-breaker
(only for voltage up to 250 V)

H2 = Signaling lamp for stored energy motor operator blocked

I 11...32 = Programmable digital inputs

I 41...43 51...53 = Analog inputs from temperature sensor

I 44-54 = Analog inputs from 4-20mA sensor

I Pt100 = Analog input from Pt100 temperature sensor of motor

I reset = Digital input for resetting tripped motor starting contactor operating unit

J... = Connectors for auxiliary circuits of withdrawable circuit-breaker. Withdrawal of connectors occurs at the same time as that of circuit-breaker

K = Motor starting contactor

K51 = Ekip type electronic relay for overcurrent protection

K51/CI = Motor starting contactor operator module

K51/COM = Communication module

K51/MEAS = Measurement module

K51/SIGN = Signaling module

K51/SUPPLY = Auxiliary supply module (110-240VAC/DC and 24-48VDC)

K51/SYNC = Synchronizing module

K51/TEMP = Temperature monitoring module

K87 = Residual current relay

M = Motor with energizing in series for circuit-breaker opening and closing (Fig. 21)

M = Motor for opening circuit-breaker and loading the closing springs (Fig. 22-54-55-56-57)

M1 = Three-phase asynchronous motor

O 11...32 = Programmable signaling contacts

OCI = Contact for motor starting contactor operating mechanism

O SC = Synchronism monitoring contact

Q = Main circuit-breaker

Q/0...7 = Auxiliary contacts of the circuit-breaker open/closed

R-R1 = Resistor

R2 = Pt100 temperature sensor of motor

S1 = Contact controlled by the motor operator cam

S2 = Contact controlled by the key lock of the direct action motor operator

S3/1-2 = Contacts operated by Auto/Manual selector switch and by key lock of the stored energy motor operator

S4 = Contact operated by direct action motor operator cam

S4/1-2 = Early auxiliary contacts operated by circuit-breaker mounted crank handle
 S51 = Contact for signaling circuit-breaker open due to tripped thermomagnetic overcurrent protection release or electronic relay
 S6/1-2 = Contacts controlled by Auto/Manual selector switch of direct action motor operator
 S75E/1-2 = Contacts for signaling circuit-breaker in withdrawn position (only applicable to withdrawable circuit-breaker versions)
 S75I/1-2-5 = Contacts for signaling circuit-breaker in racked-in position (only applicable to withdrawable or plug-in circuit-breaker versions)
 S87/1 = Contact for electrical signaling of residual current relay prealarm.
 S87/2 = Contact for electrical signaling of residual current relay alarm.
 S87/3 = Contact for electrical signaling of circuit-breaker open due to residual current relay trip.
 SC = Pushbutton or contact for closing the circuit-breaker
 SC3 = Motor start pushbutton
 SD = Residual current relay supply disconnecter
 SO = Pushbutton or contact for opening circuit-breaker
 SO3 = Motor stop pushbutton
 SR = Electrical reset pushbutton or contact
 SY/1...3 = Contacts for signaling circuit-breaker open due to tripped overcurrent protection relay, thermomagnetic release and coils YO, YO1, YO2, YU (tripped position)
 TI = Toroidal current transformer
 TI/L1-L2-L3 = L1-L2-L3 phase current transformer
 TI/N = Current transformer on neutral
 TU2 = Insulation voltage transformer (outside circuit-breaker)
 Uaux = Auxiliary supply voltage
 V1 = Circuit-breaker applications
 V2 = Motor operator applications
 V4 = Indicative switchgear and connections for operation and signaling, outside circuit-breaker
 V5 = Ekip DIN Rail Cartridge Basic or Ekip DIN Rail Cartridge applications
 W2 = Serial interface with internal bus (local bus)
 W9...14 = Connector RJ45 for interface unit and for communication modules
 W9R...12R = Connector RJ45 for redundant communication modules
 X3-X4-X8 = Protection relay connectors
 X41 = Connector of current circuit for external neutral
 XB.. = Three-way connector for auxiliary circuits of plug-in circuit-breaker
 XC.. = Six-way connector for auxiliary circuits of plug-in circuit-breaker
 XC2-3 = Six-way connector for auxiliary circuits of plug-in circuit-breaker for voltage up to 400V
 XCT1-2 = Terminal box of Ekip DIN Rail Cartridge Basic or Ekip DIN Rail Cartridge
 XD.. = Nine-way connector for auxiliary circuits of plug-in circuit-breaker
 XE.. = Fifteen-way connector for auxiliary circuits of plug-in circuit-breaker
 XF.. = Ekip Com type interface unit connector
 XG = Protection relay connector
 XH1 = Protection relay connector
 XK7 = Connector of contact S75I/5
 XM = MOE-E actuator unit connector
 XV = Terminal box of circuit-breaker applications
 YC = Closing coil of stored energy motor operator
 YO = Opening coil
 YO1 = Coil for opening due to overcurrent
 YO2 = Opening coil of residual current relay
 YU = Undervoltage coil

NOTES

- A. The presence of an auxiliary supply is required for the local bus and zone selectivity functions (see Fig. 51-81).
- B. The undervoltage coil is provided for power supply branched on the supply side of the circuit-breaker or from an independent source: circuit-breaker can only close when coil is energized (closing lock is obtained mechanically).
- C. Contacts S4/1 and S4/2 of Fig. 7-8 open circuit when circuit-breaker is open and close it again when a manual closing command is imparted by means of the rotary handle, in accordance with the Standards governing machine tools (however, circuit-breaker will not close if undervoltage release is not being supplied).
- E. If the application in Fig. 21 and the contacts in Fig. 31 must be installed at the same time, contact Q/2 must be installed in the adjacent slot (marked Q/1).
- F. R= Additional external undervoltage resistor supplied at 380/440 VAC and 480/525 VAC.
R1= Additional external resistor for stored energy motor operator or direct action motor operator supplied at 480/525VAC.
- G. If a three-pole fixed circuit-breaker with current transformer on the neutral conductor outside the circuit-breaker is used, the terminals of the TI/N transformer must be short-circuited when the circuit-breaker must be removed.
- H. "Galvanically separated converters" conforming to standards IEC 60950 (UL 1950) or equivalent must be used since an earthed Uaux is required.
- I. Mandatory in the presence of any sort of Ekip module.
- L. Only one application among Fig. 80...110 can be supplied in the case of Ekip DIN Rail Cartridge Basic.
In the case of Ekip DIN Rail Cartridge, up to three applications can be supplied among Fig. 80...110, taken once only. In addition, the Ekip Com module (if chosen) can be duplicated by choosing among Fig. 100...106.
- M. To ensure correct operation, at least one module must always be present.
- N. BELDEN 3105A cables or an equivalent type must be used.
- O. When there are several Ekip Com modules with plug-in or withdrawable circuit-breakers, one of the contacts S75I/1...4 must be connected once only to one single module.
- P. Auxiliary voltage Uaux allows all the functions of Ekip electronic protection relays to be activated. "Galvanically separated converters" conforming to standards IEC 60950 (UL 1950) or equivalent must be used since an earthed Uaux is required.
- Q. BELDEN 3105A cables or an equivalent type must be used. Maximum length 15 m.
- R. Recommended RJ45 cable: CAT6 STP.
- S. Consult "Technical Application Papers - vol. 9: Communication via BUS with ABB circuit-breakers" for connection of the EIA RS485 serial line.
- T. Short-circuit terminals 120Ω on to install a termination resistor on the Local Bus.
- U. Use Belden 3079A cables or equivalent. Consult White Paper 1SDC007412G0201 "Communication with SACE Emax 2 circuit-breakers" for further details.
- V. Use Belden 3084A cables or equivalent. Consult White Paper 1SDC007412G0201 "Communication with SACE Emax 2 circuit-breakers" for further details.
- Z. Ekip Supply cannot be used to energize the electronic relay via terminals K1 and K2.
- AA. Consult Fig. 51 or 81 for the connection of W3 and W4.
- AB. Use two-pole shielded cable type BELDEN 8762/8772 or equivalent. The shield must be earthed on the selectivity input side (for zone selectivity) or on both sides (for other applications).
- AC. The rated maximum secondary voltage is 120V.
- AD. Use insulated cables for thermocouples such as PENTRONIC TEC/SITW-24F (Type TX) or equivalent. Maximum length 3 m.
- AE. Use suitable cables up to 3 meters in length compatible with the workplace in which the 4-20mA current sensor is used

AF. Make the connection using the cable provided. There must be no break in the cable. Use of other cables or extensions using intermediate terminal boxes is not allowed. With a circuit-breaker, the poles of the protection relay are short-circuited if the external neutral is not present: apply short-circuit if connection is absent.

VERSIONS AND INCOMPATIBILITIES

The diagram illustrates a withdrawable or plug-in circuit-breaker or switch-disconnector but is also applicable to fixed circuit-breakers or switch-disconnectors.

For fixed circuit-breakers, the auxiliary circuits connect to terminal box XV; connectors J..., XB..., XC..., XD... and XE... are not supplied.

For plug-in circuit-breakers, the auxiliary circuits connect to connectors XB..., XC..., XD... and XE...; connectors J... are not supplied.

For withdrawable circuit-breakers, the auxiliary circuits connect to connectors J...; connectors XB..., XC..., XD... and XE... are not supplied.

THREE-POLE FIXED CIRCUIT-BREAKER XT1

The applications shown in the following figures can be supplied:figure 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-36-39(3p).

THREE-POLE PLUG-IN CIRCUIT-BREAKER XT1

The applications shown in the following figures can be supplied: 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-36-39(3p)-41-42-43-44.

The incompatible elements among the various different applications (X = incompatible applications) are given in the table below:

[illegible]

FOUR-POLE FIXED CIRCUIT-BREAKER XT1

The applications shown in the following figures can be supplied: 1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-36-39(3p)-39(4p).

FOUR-POLE PLUG-IN CIRCUIT-BREAKER XT1

The applications shown in the following figures can be supplied: 1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-36-39(3p)-39(4p)-41-42-43-44.

The incompatible elements among the various different applications (X = incompatible applications) are given in the table below:

[illegible]

The applications shown in the following figures can be supplied: 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-47-57-61-62-63-64-65-66-67-68-69-75-76.

The applications shown in the following figures can be supplied: 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

The applications shown in the following figures can be supplied: 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

The applications shown in the following figures can be supplied: 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-58-61-62-63-64-65-66-67-68-69-75-76.

The applications shown in the following figures can be supplied: 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-41-42-43-44-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

The applications shown in the following figures can be supplied: 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

The applications shown in the following figures can be supplied: 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

The applications shown in the following figures can be supplied: 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

DARGESTELLTER BETRIEBSZUSTAND

Das Schaltbild ist in den folgenden Betriebssituationen dargestellt:

- Leistungsschalter in der ausfahrbaren oder steckbaren Ausführung, ausgeschaltet und eingeschoben
- Schütz für den Motorstart, ausgeschaltet
- Stromkreise spannungsfrei
- Auslöser nicht ausgelöst

ZEICHENERKLÄRUNG

- * = Siehe den durch den Buchstaben gekennzeichneten Hinweis
- A12 = Schnittstelleneinheit Typ Ekip Com
- A13 = Meldeeinheit Typ Ekip Signalling 10K
- A14 = Aktuationseinheit Typ MOE-E für den Motorantrieb mit Federkraftspeicher
- A15 = Messeinheit Typ Ekip Multimeter
- A16 = Schnittstelleneinheit Typ Ekip Micro Module I/O
- A14 = Aktuationseinheit Typ MOE für den Motorantrieb mit Federkraftspeicher
- BUS1 = Serielle Schnittstelle zum externen Bus
- BUS2 = Redundante serielle Schnittstelle zum externen Bus
- LINK BUS = Schnittstelle mit den externen Link Bus
- D = Elektronische Verzögerungsvorrichtung der Unterspannungsspule YU, außerhalb des Leistungsschalters (nur für Spannungen bis zu 250 V)
- H2 = Meldelampe für den verriegelten Motorantrieb mit Federkraftspeicher
- I 11...32 = Programmierbare digitale Eingänge
- I 41...43 51...53 = Analoge Eingänge vom Temperaturfühler
- I 44-54 = Analoge Eingänge vom Sensor 4-20mA
- I Pt100 = Analogter Eingang vom Temperaturfühler Pt100 des Motors
- I reset = Digitaler Eingang für das Reset der Auslösung der Steuereinheit des Schützes für den Motorstart
- J... = Steckverbinder für die Hilfsstromkreise des Leistungsschalters in ausfahrbarer Ausführung, das Ausfahren der Steckverbinder erfolgt gleichzeitig mit dem des Leistungsschalters
- K = Schütz für den Motorstart
- K51 = Elektronisches Überstromschutzrelais Typ Ekip
- K51/CI = Steuermodul des Schützes für den Motorstart
- K51/COM = Kommunikationsmodul
- K51/MEAS = Messmodul
- K51/SIGN = Meldemodul
- K51/SUPPLY = Modul der Hilfsstromversorgung (110-240V AC/DC und 24-48V DC)
- K51/SYNC = Synchronisierungsmodul
- K51/TEMP = Temperatursteuermodule
- K87 = Fehlerstromrelais
- M = Motor mit Erregung in Reihenschaltung für die Ausschaltung und die Einschaltung des Leistungsschalters (Abb. 21)
- M = Motor zum Ausschalten des Leistungsschalters und das Spannen der Einschaltfedern (Abb. 22-54-55-56-57)
- M1 = Drehstrom-Asynchronmotor
- O 11...32 = Programmierbare Meldekontakte
- OCI = Kontakt für den Antrieb des Schützes für den Motorstart
- O SC = Kontakt für die Synchronüberwachung
- Q = Hauptschalter
- Q/0...7 = Hilfskontakte aus/ein des Leistungsschalters
- R-R1 = Widerstand
- R2 = Temperaturfühler Pt100 des Motors
- S1 = Kontakt, der vom Nocken des Motorantriebs gesteuert wird
- S2 = Kontakt, der durch die Schlüsselverriegelung des Motorantriebs mit Vor-Ort-Steuerung

gesteuert wird

- S3/1-2 = Kontakte, die durch den Wahlschalter Auto/Manual und durch die Schlüsselverriegelung des Motorantriebs mit Federkraftspeicher gesteuert werden
- S4 = Kontakt, der vom Nocken des Motorantriebs mit Vor-Ort-Steuerung gesteuert wird
- S4/1-2 = Voreilende Hilfskontakte, durch den Drehgriff des Leistungsschalters betätigt
- S51 = Kontakt zur Meldung Leistungsschalter ausgeschaltet wegen Auslösung des thermomagnetischen Überstromauslösers oder des elektronischen Relais
- S6/1-2 = Kontakte, die durch den Wahlschalter Auto/Manual des Motorantriebs mit Vor-Ort-Steuerung betätigt werden
- S75E/1-2 = Meldekontakte für Leistungsschalter in Trennstellung (nur mit Leistungsschaltern in ausfahrbarer Ausführung vorgesehen)
- S75I/1-2-5 = Meldekontakte für Leistungsschalter in Betriebsstellung (nur mit Leistungsschaltern in steckbaren oder ausfahrbarer Ausführung vorgesehen)
- S87/1 = Kontakt zur elektrischen Voralarmmeldung des Fehlerstromrelais
- S87/2 = Kontakt zur elektrischen Alarmmeldung des Fehlerstromrelais
- S87/3 = Kontakt zur elektrischen Meldung von Leistungsschalter wegen Auslösung des Fehlerstromrelais ausgeschaltet
- SC = Taste oder Kontakt zum Einschalten des Leistungsschalters
- SC3 = Taste zum Starten des Motors
- SD = Wahlschalter zur Speisung des Fehlerstromrelais
- SO = Taste oder Kontakt zum Ausschalten des Leistungsschalters
- SO3 = Taste zum Anhalten des Motors
- SR = Taste oder Kontakt zum elektrischen Reset
- SY/1...3 = Meldekontakte für Leistungsschalter ausgeschaltet wegen Ansprechen des Überstrom-Schutzrelais, des thermomagnetischen Auslösers und der Spulen YO, TO1, YO2, YU (Ausgelöst-Position)
- TI = Ringkernstromwandler
- TI/L1-L2-L3 = Stromwandler der Phasen L1-L2-L3
- TI/N = Stromwandler auf Neutraleiter
- TU2 = Isolationsspannungswandler (außerhalb des Leistungsschalters)
- Uaux = Hilfsspeisespannung
- V1 = Zubehöreinrichtungen des Leistungsschalters
- V2 = Zubehöreinrichtungen des Motorantriebs
- V4 = Geräte und Verbindungen zur Steuerung und Anzeige, außerhalb des Leistungsschalters
- V5 = Zubehöreinrichtungen des Steckmodulhalters Ekip DIN Rail Cartridge Basic oder Ekip DIN Rail Cartridge
- W2 = Serielle Schnittstelle mit internem Bus (Local Bus)
- W9...14 = Steckverbinder RJ45 für Schnittstelleneinheit und für Kommunikationsmodule
- W9R...12R = Steckverbinder RJ45 für redundante Kommunikationsmodule
- X3-X4-X8 = Steckverbinder des Schutzrelais
- X41 = Steckverbinder der amperometrischen Schaltung für den externen Neutraleiter
- XB.. = Dreipoliger Steckverbinder für die Hilfsstromkreise des Leistungsschalters in steckbarer Ausführung
- XC.. = Sechspoliger Steckverbinder für die Hilfsstromkreise des Leistungsschalters in steckbarer Ausführung
- XC2-3 = Sechspoliger Steckverbinder für die Hilfsstromkreise des Leistungsschalters in steckbarer Ausführung für Spannungen bis 400V
- XCT1-2 = Klemmenleisten des Steckmodulhalters Ekip DIN Rail Cartridge Basic oder Ekip DIN Rail Cartridge
- XD.. = Neunpoliger Steckverbinder für die Hilfsstromkreise des Leistungsschalters in steckbarer Ausführung
- XE.. = Fünfzehnpoliger Steckverbinder für die Hilfsstromkreise des Leistungsschalters in steckbarer Ausführung
- XF.. = Steckverbinder der Schnittstelleneinheit Typ Ekip Com
- XG = Steckverbinder des Schutzrelais

XH1	= Steckverbinder des Schutzrelais
XK7	= Steckverbinder des Kontakts S75I/5
XM	= Steckverbinder der Aktuatoreinheit Typ MOE-E
XV	= Klemmenleiste der Zubehöreinheiten des Leistungsschalters
YC	= Einschaltspule des Motorantriebs mit Federkraftspeicher
YO	= Ausschaltspule
YO1	= Überstromausschaltspule
YO2	= Ausschaltspule des Fehlerstromrelais
YU	= Unterspannungsspule

ANMERKUNGEN

- A. Für die Funktionen der Zonenselektivität und des Local Bus ist das Vorhandensein der Hilfsstromversorgung erforderlich (siehe Abb. 51-81).
- B. Die Unterspannungsspule wird für die Stromversorgung geliefert, die stromaufwärts vom Leistungsschalter entnommen wird oder von einer unabhängigen Stromquelle stammt. Das Einschalten des Leistungsschalters ist nur dann zulässig, wenn die Spule erregt ist (die Einschaltverriegelung wird mechanisch betätigt).
- C. Die Kontakte S4/1 und S4/2 vom Abb. 7-8 öffnen den Stromkreis bei ausgeschaltetem Leistungsschalter und schließen ihn wieder gemäß der Normen für Werkzeugmaschinen bei manueller Einschaltung mit dem Drehhebel (die Einschaltung erfolgt jedoch nicht, wenn der Unterspannungsauslöser nicht gespeist ist).
- E. Falls daher die Zubehöreinheit von Abb. 21 und die Kontakte von Abb. 31 gleichzeitig installiert werden sollen, muss der Kontakt von Q/2 in der Nute daneben (mit Q/1 markiert) installiert werden.
- F. R= Zusätzlicher externer Widerstand für Unterspannung mit Speisung bei 380/440 V AC und 480/525 V AC.
R1= Zusätzlicher externer Widerstand für den Motorantrieb mit Federkraftspeicher oder Motorantrieb mit Vor-Ort-Steuerung bei Speisung von 480/525 V AC.
- G. Im Fall des dreipoligen Leistungsschalters in fester Ausführung mit Stromwandler auf dem Neutralleiter außerhalb des Leistungsschalters muss man die Klemmen des Wandlers TI/N kurzschließen, wenn man den Leistungsschalter entfernen will.
- H. Da eine gegen Erde isolierte Hilfsspannung Vaux erforderlich ist, müssen "galvanisch getrennte Umformer" verwendet werden, die der Norm IEC 60950 (UL 1950) oder den gleichwertigen entsprechen.
- I. Zwingend vorgeschrieben, wenn irgendein Modul Ekip vorhanden ist.
- L. Im Fall des Steckmodulhalters Ekip DIN Rail Cartridge Basic kann nur eine Zubehöreinheit der Abb. 80...110 geliefert werden.
Im Fall des Steckmodulhalters Ekip DIN Rail Cartridge können bis zu drei Zubehöreinheiten der Abb. 80...110 geliefert werden, wenn man sie nur einmal wählt. Außerdem ist es möglich, das eventuell gewählte Modul Ekip Com zu verdoppeln, wenn man unter den Abb. 100...106 wählt.
- M. Für den korrekten Betrieb muss immer mindestens ein Modul vorhanden sein.
- N. Es sind BELDEN Kabel vom Typ 3105A oder gleichwertigen Typs benutzen.
- O. Bei Vorhandensein von mehreren Modulen Ekip Com mit Leistungsschaltern in steckbarer oder ausfahrbarer Ausführung wird der Kontakt S75I/1...4 nur einmal auf einem einzigen Modul angeschlossen.
- P. Die Hilfsspannung Uaux erlaubt die Aktivierung der Gesamtheit der Funktionen der elektronischen Schutzrelais EKIP. Da eine gegen Erde isolierte Hilfsspannung Vaux erforderlich ist, müssen "galvanisch getrennte Umformer" verwendet werden, die der Norm IEC 60950 (UL 1950) oder den gleichwertigen entsprechen.
- Q. Es müssen Kabel vom Typ BELDEN 3150A oder gleichwertigen Typs mit maximaler Länge von 15m verwendet werden.
- R. Empfohlenes Kabel RJ45: CAT6 STP.
- S. Für den Anschluss der seriellen Leitung EIA RS485 siehe "Technisches Anwendungsheft - Band 9: Die Kommunikation über BUS mit den ABB Leistungsschaltern."

- ## AUSFÜHRUNGEN UND INKOMPATIBILITÄT

Für die Leistungsschalter in ausfahrbarer Ausführung werden die Hilfsstromkreise an der Steckverbindern J... angeschlossen; die Steckverbinder XB..., XC..., XD... und XE... werden nicht geliefert.

DREIPOLIGER LEISTUNGSSCHALTER XT1 IN FESTER AUSFÜHRUNG

DREIPOLIGER LEISTUNGSSCHALTER XT1 IN STECKBARER AUSFÜHRUNG

Die folgende Tabelle gibt Inkompatibilitäten den verschiedenen Zubehöreinrichtungen an (X = inkompatible Zubehörteile):

[illegible]

Die in den Abbildungen dargestellten Zubehöreinrichtungen können geliefert werden 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-58-61-62-63-64-65-66-67-68-69-75-76.

Die in den Abbildungen dargestellten Zubehöreinrichtungen können geliefert werden 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-41-42-43-44-58-61-62-63-64-65-66-67-68-69-75-76.

Die folgende Tabelle gibt Inkompatibilitäten den verschiedenen Zubehöreinrichtungen an (X = inkompatible Zubehörteile):

[illegible]

Die in den Abbildungen dargestellten Zubehöreinrichtungen können geliefert werden 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

Die in den Abbildungen dargestellten Zubehöreinrichtungen können geliefert werden 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

Die folgende Tabelle gibt Inkompatibilitäten den verschiedenen Zubehöreinrichtungen an (X = inkompatible Zubehörteile):

[illegible]

Die in den Abbildungen dargestellten Zubehöreinrichtungen können geliefert werden 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

ETAT DE FONCTIONNEMENT REPRÉSENTÉ

Le schéma est représenté dans les conditions suivantes :

- disjoncteur en version déconnectable ou débrochable, ouvert et embroché
- contacteur de démarrage du moteur ouvert
- circuits hors tension
- déclencheurs non intervenus

LEGENDE

* = Voir la remarque indiquée par la lettre

A12 = Unité d'interface type Ekip Com

A13 = Unité de signalisation type Ekip Signalling 10K

A14 = Unité d'actionnement type MOE-E pour la commande à moteur à accumulation d'énergie

A15 = Unité mesures type Ekip Multimeter

A16 = Unité d'interface type Ekip Micro Module E/S

A17 = Unité d'actionnement type MOE-E pour la commande à moteur à accumulation d'énergie

BUS1 = Interface série avec le bus extérieur

BUS2 = Interface série redondant avec le bus extérieur

LINK BUS = Interface avec le Link bus extérieur

D = Temporisateur électronique de la bobine à minimum de tension YU, externe au disjoncteur
(pour tensions jusqu'à 250V seulement)

H2 = Lampe de signalisation pour commande à moteur à accumulation d'énergie verrouillé

I 11...32 = Entrées numériques programmables

I 41...43 51...53 = Entrées analogiques du capteur de température

I 44-54 = Entrées analogiques du capteur 4-20mA

I Pt100 = Entrée analogique du capteur de température Pt100 du moteur

I reset = Entrée numérique pour la remise à zéro du déclenchement de l'unité de commande contacteur
de démarrage moteur

J... = Connecteurs pour les circuits auxiliaires du disjoncteur dans la version sur chariot,
l'extraction des connecteurs se fait en même temps que le disjoncteur.

K = Contacteur de démarrage du moteur

K51 = Relais électronique de protection à maximum de courant type Ekip

K51/CI = Module de commande contacteur de démarrage du moteur

K51/COM = Module de communication

K51/MEAS = Module mesures

K51/SIGN = Module de signalisation

K51/SUPPLY = Module alimentation auxiliaire (110-240VAC/DC et 24-48VDC)

K51/SYNC = Module Synchronisation

K51/TEMP = Module de contrôle température

K87 = Relai différentiel

M = Moteur avec excitation en série pour l'ouverture et la fermeture du disjoncteur (Fig.
21)

M = Moteur pour l'ouverture du disjoncteur et le bandage des ressorts de fermeture (Fig.
22-54-55-56-57)

M1 = Moteur asynchrone triphasé

O 11...32 = Contacts de signalisation programmables

OCI = Contact pour la commande du contacteur de démarrage moteur

O SC = Contact pour le contrôle de synchronisme

Q = Interrupteur principal

Q/0...7 = Contacts auxiliaires ouvert/fermé du disjoncteur

R-R1 = Résistance

R2 = Capteur de température Pt100 du moteur

S1 = Contact commandé par la came de la commande à moteur

S2 = Contact commandé par le verrouillage par clé de la commande par moteur à action directe

S3/1-2 = Contacts commandés par le sélecteur Auto/Manual et par le verrouillage par clé de la

commande par moteur à accumulation d'énergie

S4 = Contact commandé par la came de la commande par moteur à action directe

S4/1-2 = Contacts auxiliaires anticipés actionnés par la poignée tournante du disjoncteur

S51 = Contact de signalisation de disjoncteur ouvert pour intervention du déclencheur de protection à maximum de courant thermomagnétique ou du relais électronique

S6/1-2 = Contacts commandés par le sélecteur Auto/Manual de la commande par moteur à action directe

S75E/1-2 = Contacts pour la signalisation électrique de disjoncteur en position débroché (prévus seulement avec disjoncteurs dans la version déconnectable)

S75I/1-2-5 = Contacts pour la signalisation de disjoncteur en position embroché (prévus seulement avec disjoncteurs dans la version déconnectable ou débrochable)

S87/1 = Contact pour la signalisation électrique de pré-alarme du relais différentiel

S87/2 = Contact pour la signalisation électrique d'alarme du relais différentiel

S87/3 = Contact pour la signalisation électrique de disjoncteur ouvert par intervention du relais différentiel

SC = Bouton-poussoir ou contact de fermeture du disjoncteur

SC3 = Bouton-poussoir de démarrage du moteur

SD = Sectionneur de l'alimentation du relais différentiel

SO = Bouton-poussoir ou contact d'ouverture du disjoncteur

SO3 = Bouton-poussoir pour l'arrêt du moteur

SR = Bouton-poussoir ou contact de remise à zéro électrique

SY/1...3 = Contacts de signalisation de disjoncteur ouvert pour intervention du relais de protection à maximum de courant, du déclencheur thermomagnétique et des bobines YO, YO2, YU (position de déclenché)

TI = Transformateur de courant torique

TI/L1-L2-L3 = Transformateur de courant phase L1-L2-L3

TI/N = Transformateur de courant sur le neutre

TU2 = Transformateur de tension d'isolement (extérieur au disjoncteur)

Uaux = Tension d'alimentation auxiliaire

V1 = Applications du disjoncteur

V2 = Applications de la commande à moteur

V4 = Appareils et raccordements indicatifs pour commande et signalisation, extérieurs au disjoncteur

V5 = Applications du porte élément de remplacement Ekip DIN Rail Cartridge Basic ou Ekip DIN Rail Cartridge

W2 = Interface série avec le bus interne (Local Bus)

W9...14 = Connecteur RJ45 pour unités d'interface et pour modules de communication

W9R...12R = Connecteur RJ45 pour modules communication redondants

X3-X4-X8 = Connecteurs du relais de protection

X41 = Connecteur du circuit ampèremétrique pour neutre extérieur

XB.. = Connecteur à trois voies pour les circuits auxiliaires du disjoncteur en version déconnectable

XC.. = Connecteur à six voies pour les circuits auxiliaires du disjoncteur version déconnectable

XC2-3 = Connecteur à six voies pour les circuits auxiliaires du disjoncteur version déconnectable pour tensions jusqu'à 400V

XT1-2 = Borniers du porte élément de remplacement Ekip DIN Rail Cartridge Basic ou Ekip DIN Rail Cartridge

XD.. = Connecteur à neuf voies pour les circuits auxiliaires du disjoncteur version déconnectable

XE.. = Connecteur à quinze voies pour les circuits auxiliaires du disjoncteur en version déconnectable

XF.. = Connecteur de l'unité d'interface type Ekip Com

XG8 = Connecteur du relais de protection

XH1 = Connecteur du relais de protection

XK7 = Connecteur du contact S75I/5

XM = Connecteur de l'unité actionneur type MOE-E

XV = Borniers des applications du disjoncteur

- YC = Bobine de fermeture de la commande par moteur à accumulation d'énergie
- YO = Bobine d'ouverture
- YO1 = Bobine d'ouverture à maximum de courant
- YO2 = Bobine d'ouverture du relais différentiel
- YU = Bobine à minimum de tension

REMARQUES

- A. Pour les fonctions de sélectivité de zone et de Local bus la présence d'alimentation auxiliaire est nécessaire (voir Fig. 51-81).
- B. La bobine à minimum de tension est fournie pour alimentation dérivée en amont du disjoncteur ou par une source indépendante : la fermeture du disjoncteur est permise seulement avec bobine excitée (le verrouillage de la fermeture est réalisé mécaniquement).
- C. Les contacts S4/1 et S4/2 des figures 7-8 ouvrent le circuit quand le disjoncteur est ouvert et le referment quand est réalisée une commande de fermeture manuelle par poignée rotative, conformément aux Normes relatives aux machines outils (la fermeture n'a quand même pas lieu si le déclencheur à minimum de tension n'est pas alimenté).
- E. Au cas où l'on désire installer en même temps l'application de la Fig. 21 et les contacts de la Fig. 31, le contact Q/2 devra être installé dans l'encoche adjacente (repérée par Q/1).
- F. R= Résistance extérieure supplémentaire à minimum de tension alimentée à 380/440Vca et 480/525Vca.
R1= Résistance extérieure supplémentaire pour commande à moteur à accumulation d'énergie ou commande à moteur à action directe alimentés à 480/525Vca.
- G. En cas de disjoncteur tripolaire en version fixe avec transformateur de courant sur conducteur neutre extérieur au disjoncteur, quand on veut enlever le disjoncteur il faut court-circuiter les bornes du transformateur TI/N.
- H. Etant donné qu'une Vaux isolée de la terre est requise, il faut utiliser des " convertisseurs séparés galvaniquement " conformes aux normes IEC 60950 (UL 1950) ou ses équivalents.
- I. Obligatoire en cas de présence de n'importe quel module Ekip.
- L. En cas de porte-élément de remplacement Ekip DIN Rail Cartridge Basic une seule application peut être fournie entre les Fig. 80...110.
En cas de porte-élément de remplacement Ekip DIN Rail Cartridge trois applications peuvent être fournies entre les Fig. 80...110 prises une seule fois. Il est aussi possible de dupliquer le module Ekip Com éventuellement sélectionné en choisissant entre les Fig. 100...106.
- M. Pour le fonctionnement correct au moins un module doit toujours être présent.
- N. Il faut utiliser des câbles type BELDEN 3105A ou équivalent.
- O. En présence de plusieurs modules Ekip Com avec disjoncteurs dans la version débrochable, un des contacts S75I/1...4 doit être connecté une seule fois sur un seul module.
- P. La tension auxiliaire Uaux. permet l'activation de la totalité des fonctionnalités des relais de protection électroniques EKIP. Etant donné qu'une Vaux isolée de la terre est requise, il faut utiliser des "convertisseurs séparés galvaniquement" conformes aux normes IEC 60950 (UL 1950) ou ses équivalents.
- Q. Il faut utiliser des câbles type BELDEN 3105A ou équivalent, d'une longueur maximale de 15m.
- R. Câble RJ45 suggéré : CAT6 STP.
- S. Pour le raccordement de la ligne série EIA RS485 voir le "Cahier Application Technique - vol. 9 : La communication via BUS avec les disjoncteurs ABB".
- T. Court-circuiter les bornes 120Ω si on désire introduire une résistance de terminaison sur le Local Bus.
- U. Utiliser des câbles Belden type 3079A ou équivalent. Pour plus de détails voir la Présentation Technique 1SDC007412G0201 "Communication avec le disjoncteur SACE Emax 2".
- V. Utiliser des câbles Belden type 3084A ou équivalent. Pour plus de détails voir la Présentation Technique 1SDC007412G0201 "Communication avec le disjoncteur SACE Emax 2".

Les applications indiquées dans les figures peuvent être fournies 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-58-61-62-63-64-65-66-67-68-69-75-76.

Les applications indiquées dans les figures peuvent être fournies 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-41-42-43-44-58-61-62-63-64-65-66-67-68-69-75-76.

Le tableau suivant indique les incompatibilités entre les différentes applications (X = applications incompatibles):

[illegible]

Les applications indiquées dans les figures peuvent être fournies 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

Les applications indiquées dans les figures peuvent être fournies 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

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[illegible]

Les applications indiquées dans les figures peuvent être fournies 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

ESTADO DE FUNCIONAMIENTO REPRESENTADO

El esquema está representado en las siguientes condiciones:

- interruptor en ejecución extraíble o enchufable, abierto e insertado
- contactor para el arranque del motor abierto
- circuitos sin tensión
- relés sin actuar

NOTAS

* = Véase la nota indicada con la letra

A12 = Unidad de interfaz tipo Ekip Com

A13 = Unidad de señalización tipo Ekip Signalling 10K

A14 = Unidad de actuación tipo MOE-E para el mando a motor con acumulación de energía

A15 = Unidad medidas tipo Ekip Multimeter

A16 = Unidad de interfaz tipo Ekip Micro Module I/O

A17 = Unidad de actuación tipo MOE para el mando a motor con acumulación de energía

BUS1 = Interfaz serial con el bus externo

BUS2 = Interfaz serial redundante con el bus externo

LINK BUS = Interfaz con el Link bus externo

D = Retardador electrónico de la bobina de mínima tensión YU, externo al interruptor (sólo para tensiones de hasta 250V)

H2 = Lámpara de señalización para el mando a motor con acumulación de energía bloqueado

I 11...32 = Entradas digitales programables

I 41...43 51...53 = Entradas analógicas de sensor de temperatura

I 44-54 = Entradas analógicas de sensor 4-20mA

I Pt100 = Entrada analógica de sensor de temperatura Pt100 del motor

I reset = Entrada digital para el reset del disparo de la unidad de mando del contactor de arranque motor

J... = Conectores para los circuitos auxiliares del interruptor en ejecución extraíble, la extracción de los conectores se produce simultáneamente con la del interruptor

K = Contactor para el arranque del motor

K51 = Relé electrónico de protección de máxima corriente tipo Ekip

K51/CI = Módulo de mando contactor para el arranque del motor

K51/COM = Módulo de comunicación

K51/MEAS = Módulo de medidas

K51/SIGN = Módulo de señalización

K51/SUPPLY = Módulo de alimentación auxiliar (110-240VAC/DC y 24-48VDC)

K51/SYNC = Módulo de sincronización

K51/TEMP = Módulo de control temperatura

K87 = Relé diferencial

M = Motor con excitación en serie para la apertura y el cierre del interruptor (Fig. 21)

M = Motor para la apertura del interruptor y la carga de los resortes de cierre (Fig. 22-54-55-56-57)

M1 = Motor asíncrono trifásico

O 11...32 = Contactos de señalización programables

OCI = Contacto para el mando del contactor de arranque motor

O SC = Contacto para el control de sincronismo

Q = Interruptor principal

Q/0...7 = Contactos auxiliares abierto/cerrado del interruptor

R-R1 = Resistor

R2 = Sensor de temperatura Pt100 del motor

S1 = Contacto controlado por la leva del mando a motor

S2 = Contacto controlado por el bloqueo de llave del mando a motor de acción directa

S3/1-2 = Contactos controlados por el selector Auto/Manual y por el bloqueo de llave del mando a motor con acumulación de energía

S4 = Contacto controlado por la leva del mando a motor de acción directa

S4/1-2 = Contactos auxiliares anticipados accionados por el mando giratorio del interruptor
 S51 = Contacto de señalización de interruptor abierto por actuación del relé de protección de máxima corriente termomagnético o del relé electrónico
 S6/1-2 = Contactos controlados por el selector Auto/Manual del mando a motor de acción directa
 S75E/1-2 = Contactos para la señalización de interruptor en posición de extraído (previstos sólo con interruptores en ejecución extraíble)
 S75I/1-2-5 = Contactos para la señalización de interruptor en posición de insertado (previstos sólo con interruptores en ejecución enchufable o extraíble)
 S87/1 = Contacto para la señalización eléctrica de prealarma del relé diferencial
 S87/2 = Contacto para la señalización eléctrica de alarma del relé diferencial
 S87/3 = Contacto para la señalización eléctrica de interruptor abierto por actuación del relé diferencial
 SC = Pulsador o contacto para el cierre del interruptor
 SC3 = Pulsador para el arranque del motor
 SD = Seccionador de la alimentación del relé diferencial
 SO = Pulsador o contacto para la apertura del interruptor
 SO3 = Pulsador para la parada del motor
 SR = Pulsador o contacto de reset eléctrico
 SY/1...3 = Contactos de señalización de interruptor abierto por actuación del relé de protección de máxima corriente, del relé termomagnético y de las bobinas YO, YO1, YO2, YU (posición de disparado)
 TI = Transformador de corriente toroidal
 TI/L1-L2-L3 = Transformador de corriente fase L1-L2-L3
 TI/N = Transformador de corriente en el neutro
 TU2 = Transformador de tensión de aislamiento (externo al interruptor)
 Uaux = Tensión de alimentación auxiliar
 V1 = Aplicaciones del interruptor
 V2 = Aplicaciones del mando a motor
 V4 = Aparatos y conexiones indicativos para mando y señalización, externos al interruptor
 V5 = Aplicaciones de los módulos tipo cartucho Ekip DIN Rail Cartridge Basic o Ekip DIN Rail Cartridge
 W2 = Interfaz serial con el bus interno (bus local)
 W9...14 = Conector RJ45 para unidad de interfaz y para módulos de comunicación
 W9R...12R = Conector RJ45 para módulos de comunicación redundantes
 X3-X4-X8 = Conectores del relé de protección
 X41 = Conector del circuito amperimétrico para neutro externo
 XB.. = Conector de tres vías para los circuitos auxiliares del interruptor en ejecución enchufable
 XC.. = Conector de seis vías para los circuitos auxiliares del interruptor en ejecución enchufable
 XC2-3 = Conector de seis vías para los circuitos auxiliares del interruptor en ejecución enchufable para tensiones de hasta 400V
 XCT1-2 = Regleta de bornes de los módulos tipo cartucho Ekip DIN Rail Cartridge Basic o Ekip DIN Rail Cartridge
 XD.. = Conector de nueve vías para los circuitos auxiliares del interruptor en ejecución enchufable
 XE.. = Conector de quince vías para los circuitos auxiliares del interruptor en ejecución enchufable
 XF.. = Conector de la unidad de interfaz tipo Ekip Com
 XG = Conector del relé de protección
 XH1 = Conector del relé de protección
 XK7 = Conector del contacto S75I/5
 XM = Conector de la unidad de actuación tipo MOE-E
 XV = Regleta de bornes de las aplicaciones del interruptor
 YC = Bobina de cierre del mando a motor con acumulación de energía
 YO = Bobina de apertura
 YO1 = Bobina de apertura para máxima corriente
 YO2 = Bobina de apertura del relé diferencial
 YU = Bobina de mínima tensión

NOTAS

- A. Para las funciones de selectividad de zona y bus local es necesaria la presencia de alimentación auxiliar (véase Fig. 51-81).
- B. La bobina de mínima tensión se suministra para alimentación derivada aguas arriba del interruptor o de una fuente independiente: está permitido el cierre del interruptor sólo con la bobina excitada (el bloqueo del cierre se logra mecánicamente).
- C. Los contactos S4/1 y S4/2 de la Fig. 7-8 abren el circuito con interruptor abierto y lo vuelven a cerrar cuando se da un mando de cierre manual, mediante mando giratorio, de conformidad con las Normas relativas a las máquinas herramientas (el cierre no se produce si la bobina de mínima tensión no está alimentada).
- E. Si se desea instalar simultáneamente la aplicación de la Fig. 21 y los contactos de la Fig. 31, se deberá instalar el contacto Q/2 en la ranura adyacente (identificada con la sigla Q/1).
- F. R = Resistor externo adicional para mínima tensión alimentada a 380/440Vca y 480/525Vca.
R1= Resistor externo adicional para mando a motor con acumulación de energía o mando a motor de acción directa alimentados a 480/525Vca.
- G. En el caso de interruptor tripolar en ejecución fija con transformador de corriente en conductor neutro externo al interruptor, para sacar el interruptor es necesario cortocircuitar los bornes del transformador TI/N.
- H. Al requerirse una corriente Uaux aislada de tierra, es necesario utilizar "convertidores galvánicamente separados" conformes con las normas IEC 60950 (UL 1950) o equivalentes.
- I. Obligatorio si está presente cualquier módulo Ekip.
- L. En caso de módulo tipo cartucho Ekip DIN Rail Cartridge Basic puede ser suministrada una sola aplicación entre las Fig. 80...110.
En caso de módulo tipo cartucho Ekip DIN Rail Cartridge pueden ser suministradas hasta tres aplicaciones entre las Fig. 80...110 consideradas una sola vez. Es posible además duplicar el módulo Ekip Com eventualmente seleccionado eligiendo entre las Fig. 100...106.
- M. Para el funcionamiento correcto debe estar presente siempre al menos un módulo.
- N. Deben usarse cables tipo BELDEN 3105A o equivalente.
- O. En presencia de varios módulos Ekip Com con interruptores en ejecución enchufable o extraíble, uno de los contactos S75I/1...4 deberá conectarse una sola vez en un solo módulo.
- P. La tensión auxiliar Uaux. permite activar todas las funcionalidades de los relés de protección electrónicos EKIP. Al requerirse una corriente Uaux aislada de tierra, es necesario utilizar "convertidores galvánicamente separados" conformes con las normas IEC 60950 (UL 1950) o equivalentes.
- Q. Se deberán usar cables tipo BELDEN 3105A o equivalente, con longitud máxima de 15m.
- R. Cable RJ45 sugerido: CAT6 STP.
- S. Para la conexión de la línea serial EIA RS485 véase el "Cuaderno Aplicación Técnica - vol. 9: La Comunicación vía BUS con los interruptores ABB".
- T. Cortocircuitar los bornes 120Ω on si se desea insertar una resistencia de terminación en el Bus local.
- U. Usar cables Belden tipo 3079A o equivalente. Para más información véase el informe técnico 1SDC007412G0201 "Comunicación con interruptor SACE Emax 2".
- V. Usar cables Belden tipo 3084A o equivalente. Para más información véase el informe técnico 1SDC007412G0201 "Comunicación con interruptor SACE Emax 2".
- Z. Para la alimentación al relé electrónico mediante bornes K1 y K2 no es posible utilizar Ekip Supply.
- AA. Para la conexión de W3 y W4 véanse las Fig. 51 o 81.
- AB. Utilizar cable bipolar apantallado tipo BELDEN 8762/8772 o equivalente. La pantalla debe ser conectada a tierra del lado entrada de selectividad (para selectividad de zona) o de ambos lados (para otras aplicaciones).
- AC. La tensión secundaria asignada máxima es de 120V.
- AD. Utilizar cables aislados por termopares tipo PENTRONIC TEC/SITW-24F (tipo TX) o equivalente,

AE. Utilizar cables idóneos y compatibles con el ambiente de trabajo en el cual se utilizará el sensor de corriente 4-20mA, con una longitud no superior a 3m.

AF. La conexión se deberá efectuar con el cable suministrado; no está permitida la interrupción del cable y no se admite el uso de otros cables ni su extensión mediante regletas de conexión intermedias. Con interruptor, si no está presente el neutro externo, los polos del conector del relé de protección están cortocircuitados: si no está presente la conexión, insertar el cortocircuito.

Para los interruptores en ejecución extraíble los circuitos auxiliares se disponen en los conectores J...; los conectores XB..., XC..., XD... y XE... no son suministrados.

La siguiente tabla indica las incompatibilidades entre las diversas aplicaciones (X= aplicaciones incompatibles):

[illegible]

La siguiente tabla indica las incompatibilidades entre las diversas aplicaciones (X= aplicaciones incompatibles):

[illegible]

Pueden ser suministradas las aplicaciones indicadas en las figuras 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

Pueden ser suministradas las aplicaciones indicadas en las figuras 1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

Pueden ser suministradas las aplicaciones indicadas en las figuras 1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

[illegible]

表示的运行状态

该图表示以下条件：

- 可抽取式或可拆卸式断路器断开和插入
- 电机启动接触器打开
- 回路无电压
- 启动器未干预

缩略语

- * = 参阅字母所指的注释
- A12 = Ekip Com型接口单元
- A13 = Ekip Signalling 10K型信号单元
- A14 = 用于储能电机驱动的MOE-E型执行单元
- A15 = Ekip万用表型测量单元
- A16 = Ekip微型模块I/O接口单元
- A17 = 用于储能电机驱动的MOE型执行单元
- BUS1 = 与外部总线的串行接口
- BUS2 = 与外部总线的冗余串行接口
- LINK BUS = 与外部总线链接的接口
- D = 断路器外部的欠压线圈YU电子延迟器（仅适用于250V以下的电压）
- H2 = 用于储能电机驱动的信号灯
- I 11 ... 32 = 可编程数字输入
- I 41 ... 43 51 ... 53 = 温度传感器的模拟输入
- I 44-54 = 4-20mA传感器的模拟输入
- I Pt100 = 电机Pt100温度传感器的模拟输入
- I reset = 用于复位电机启动接触器的控制单元释放的数字输入
- J ... = 可抽取式断路器辅助电路的连接器的拔出与断路器的拔出同时进行
- K = 用于启动电机的接触器
- K51 = Ekip型最大电流保护电子继电器
- K51/CI = 用于电机起动的接触器控制模块
- K51/COM = 通信模块
- K51/MEAS = 测量模块
- K51/SIGN = 信号模块
- K51/SUPPLY = 辅助电源模块（110-240VAC/DC 和 24-48VDC）
- K51/SYNC = 同步模块
- K51/TEMP = 温度控制模块
- K87 = 差动继电器
- M = 具有串联励磁的电机，用于断路器的断开和闭合（图21）
- M = 用于打开断路器和加载闭合弹簧的电机（图22-54-55-56-57）
- M1 = 三相异步电机
- O 11...32 = 可编程的信号触点
- OCI = 用于控制电机启动接触器的触点
- O SC = 用于控制同步的触点
- Q = 主断路器
- Q/0...7 = 断路器断开/闭合的辅助触点
- R-R1 = 电阻器
- R2 = 电机Pt100温度传感器
- S1 = 触点受电机驱动凸轮控制
- S2 = 由直动电机驱动钥匙锁控制的触点
- S3/1-2 = 触点由自动/手动选择器和储能电机驱动钥匙锁控制
- S4 = 触点由直动电机驱动凸轮控制
- S4/1-2 = 由断路器旋转手柄操作的推进辅助触点
- S51 = 由于热磁最大电流保护脱扣器干预或电子继电器干预，断路器的信号触点断开
- S6/1-2 = 由直动电机驱动的自动/手动选择器控制的触点
- S75E/1-2 = 断路器在抽出位置的信号触点（仅适用于具有可抽取式断路器的情形）
- S75I/1-2-5 = 断路器在插入位置的信号触点（仅适用于具有可拆卸式或可抽取式断路器的情形）
- S87/1 = 差动继电器的电子预警信号触点
- S87/2 = 差动继电器的电子报警信号触点
- S87/3 = 由于差动继电器的干预，断路器的电子信号触点断开
- SC = 断路器闭合的按钮或触点

SC3 = 用于启动电机的按钮
 SD = 差动继电器的电源切断开关
 SO = 断路器打开的按钮或触点
 SO3 = 用于停止电机的按钮
 SR = 电气复位的按钮或触点
 SY/1...3 = 由于热磁脱扣器和YO、YO1、YO2、YU线圈（跳闸位置）的过电流保护继电器跳闸，断路器的信号触点断开。
 TI = 环形电流互感器
 TI/L1-L2-L3 = L1-L2-L3 相位电流互感器
 TI/N = 电流互感器在中性
 TU2 = 隔离电压互感器（断路器外部）
 Uaux = 辅助电源电压
 V1 = 断路器的应用
 V2 = 电机驱动应用
 V4 = 用于断路器外部控制和信号的参考设备和连接
 V5 = Ekip DIN 基本款导轨盒或Ekip DIN 导轨盒的应用
 W2 = 与内部总线的串行接口（本地总线）
 W9...14 = 用于接口单元和通信模块的连接器RJ45
 W9R...12R = 用于冗余通信模块的连接器RJ45
 X3-X4-X8 = 保护继电器的连接器
 X41 = 用于外部中性线的安培计电路连接器
 XB... = 用于可拆卸断路器辅助电路的三通连接器
 XC... = 用于可拆卸断路器辅助电路的六路连接器
 XC2-3 = 用于可拆卸断路器辅助电路的六路连接器，电压在400V以下
 XCT1-2 = Ekip DIN 基本款导轨盒或Ekip DIN 导轨盒的端子板
 XD... = 用于可拆卸断路器辅助电路的九路连接器
 XE... = 用于可拆卸断路器辅助电路的十五路连接器
 XF... A12 = Ekip Com 型接口单元连接器
 XG = 保护继电器的连接器
 XH1 = 保护继电器的连接器
 XK7 = S75I/5 触点连接器
 XM = MOE-E型执行单元连接器
 XV = 断路器应用端子板
 H2 = 储能电机驱动的闭合线圈
 YO = 开启线圈
 YO1 = 最大电流开启线圈
 YO2 = 差动继电器开启线圈
 YU = 最小电压线圈

注

- A. 为使用区域和局部总线选择功能，必须存在辅助电源（见图51-81）。
- B. 欠压线圈用于来自断路器上游的电源或独立电源：断路器只能在线圈通电时才能闭合（闭合的锁定是机械地进行的）。
- C. 图7-8的触点S4/1和S4/2在断路器打开时打开电路，当通过旋转手柄手动关闭命令时则关闭电路，均符合与机床相关的标准（欠压线圈如果未通电，就不会关闭电路）。
- D. 如果要同时安装图21的应用和图31的触点，则必须将触点Q/2安装在相邻的插槽中（用Q/1标记）。
- E. R= 额外的外部电阻器，用于380/440Vac 和480/525Vac 的最小电压。
R1=额外的外部电阻器，用于储能电机驱动或者480/525Vac 供电的直动电机驱动。
- G 如果是固定型的三极断路器，且在断路器外部的中性导线上带有电流互感器，则在移除断路器时，必须使 TI/N 变压器的端子短路。
- G. 由于地面需要隔离的Uaux，必须使用符合IEC 60950 （UL 1950 ）或其等效标准的“电隔离转换器”。
- H. 在存在任何Ekip 模块的情况下必须提供。
- I. 使用Ekip DIN 基本款导轨盒时，只可提供图83...97-131-132 之间的一种应用。
\$使用Ekip DIN 导轨盒时，最多可提供图83...97-131-132 之间的三种应用。也可以在图110...116 之间选择来复制选定的Ekip Com 模块。
- M. 为能正确运行，必须始终存在至少一个模块。
- N. 应使用BELDEN 3105A型或等效的电缆。
- O. 在带有插拔式或可抽取式断路器的多个Ekip Com模块存在的情况下，S75I/1...4触点只能一次连接一个模块。
- P. 辅助电压Uaux允许激活EKIP电子保护继电器的全部功能。由于地面需要隔离的Uaux，必须使用符合IEC 60950 （UL

固定式三极断路器XT3

可提供图中所示的应用 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-34-36-39.

可拆卸式三极断路器XT3

可提供图中所示的应用 1-3-5(3p)-6(3p)-7(3p)-8(3p)-9-10-11-12-13-21-31-34-36-39-41-42-43-44.

下表指出了各应用之间的不兼容性 (X=不兼容的应用):

[illegible]

固定式四极断路器XT3

可提供图中所示的应用

1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-34-36-39(3p)-39(4p).

可拆卸式四极断路器XT3

可提供图中所示的应用

1-2(3p)-2(4p)-3(3p)-3(4p)-4(3p)-4(4p)-5(3p)-5(4p)-6(3p)-6(4p)-7(3p)-7(4p)-8(3p)-8(4p)-9-10-11-12-13-21-31-34-36-39(3p)-39(4p)-41-42-43-44.

下表指出了各应用之间的不兼容性 (X=不兼容的应用):

[illegible]

固定式三极断路器XT2 或XT4

可提供图中所示的应用

1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-47-58-61-62-63-64-65-66-67-68-69-75-76.

可拆卸式三极断路器XT2

可提供图中所示的应用

1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

可拆卸式三极断路器XT4

可提供图中所示的应用

1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-36-37-38-39-41-42-43-44-47-58-61-62-63-64-65-66-67-68-69-75-76.

下表指出了各应用之间的不兼容性 (X=不兼容的应用):

[illegible]

固定式四极断路器XT2 或XT4

可提供图中所示的应用

1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-58-61-62-63-64-65-66-67-68-69-75-76.

可拆卸式四极断路器XT2 或XT4

可提供图中所示的应用

1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-36-37-38-41-42-43-44-58-61-62-63-64-65-66-67-68-69-75-76.

下表指出了各应用之间的不兼容性 (X=不兼容的应用):

[illegible]

可提供图中所示的应用

1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

可提供图中所示的应用

1(3p)-3(3p)-5(3p)-6(3p)-7(3p)-8(3p)-9-10-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

下表指出了各应用之间的不兼容性 (X=不兼容的应用)：

[illegible]

可抽取式四极断路器XT2 或XT4

可提供图中所示的应用

1-2-3-4-5(3p)-5(4P)-6(3p)-6(4P)-7(3p)-7(4P)-8(3p)-8(4P)-9-10-11-12-13-22-23-31-32-33-34-35-37-38-41-42-43-44-45-46-58-61-62-63-64-65-66-67-68-69-75-76.

下表指出了各应用之间的不兼容性 (X=不兼容的应用)：

[illegible]