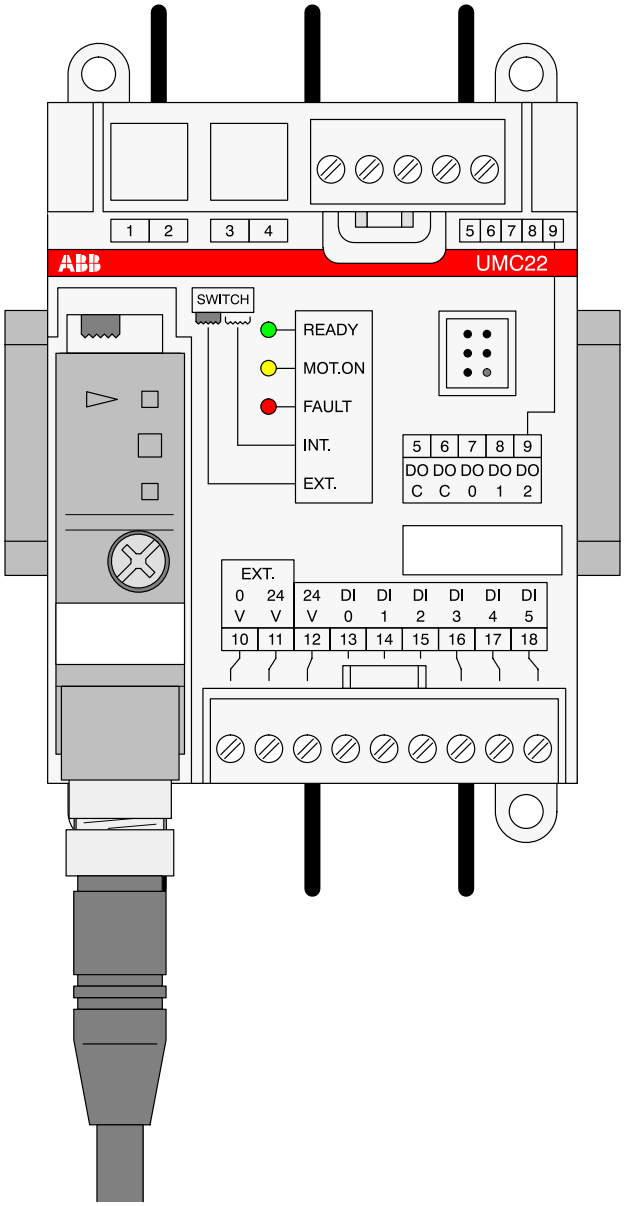
Technical Description

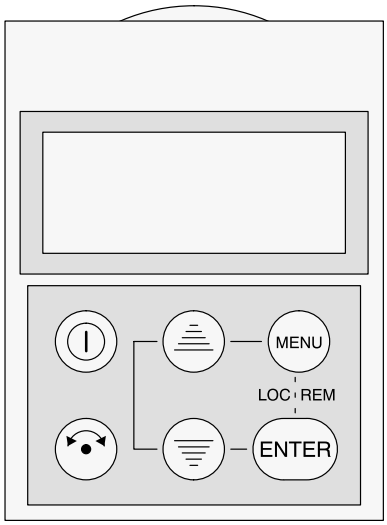
FBP FieldBusPlug

V6

Preliminary Documentation
This document describes the planned functions of SW-Version 3.2 that subject to change.

Universal Motor Controller
UMC22-FBP





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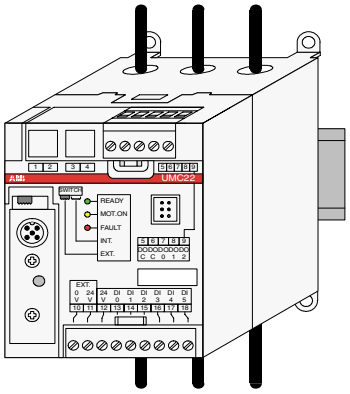


Universal Motor Controller
for high-grade motor protection and control,
current range 0.24 to 63 A, up to 850 A
with external current transformers,
with 6 digital inputs and 3 digital outputs,
to connect to fieldbuses via FieldBusPlug
or stand alone

Fig. 1: Universal Motor Controller UMC22-FBP

Contents

Features / New Features

Overview

- The Universal Motor Controller UMC22 provides high-grade motor protection and control for the current range 0,24 up to 63 A with one type.
  For higher currents up to 850 A additional protection current transformers are prepared.
- With the integrated FieldBusPlug interface the UMC22 can be connected to different fieldbuses using the appropriate type of FieldBusPlug.
  But stand-alone operation - without FieldBusPlug - is just as good possible.
- 6 digital inputs and 3 relay outputs offer to realize a wide range of predefined control functions and applications such as 'Direct Start', 'Star-Delta-Start' including 'Local Operation via Digital Inputs' and others as selected by parameters.
- The status of the digital inputs, detailed diagnosis information and the parameters are accessible via the fieldbus (supposed the fieldbus offers the appropiate features).
- LEDs on the UMC22 monitor 'Ready', 'Motor On' or 'Fault'.
- Additional the Control Panel ACS100-PAN (separate delivery) offers similar access to all important information. The Control Panel is necessary to set the fieldbus slave address and can be snapped in on the front of the UMC22.
- Also the overload protection behaviour and other functions can be changed by parameters in a wide range. More details see chapters "Parameters ...".
- The control function 'Overload' is dedicated to use the UMC22 like an overload relay with and without fieldbus connection. The other control functions can be used stand alone also.
- The UMC22 is prepared to protect motors in potential explosive atmospheres. See appropriate chapter "ATEX commisssioning".

Features - construction

- The UMC22-FBP consists of two separate parts: Current Transformer Set and Controller Unit, mounted as one device.
- Mounting on DIN rail or with screws. W*H*D=70*105*110mm. Protection degree IP20.
- Current carrying motor conductors are lead through the Current Transformer Set.
- Replacement of the Controller Unit without removing the motor current carrying lines.
- Parameters are saved in the Current Transformer Set even if power down happens. This allows to replace the Control Unit without reparametrizing.
- Current Transformers can be mounted remote from the UMC22 up to the connection line l ength 2 m.

Features - overload protection

- Measuring the motor current (value is displayed on the Control Panel and provided also to be sent to the fieldbus).
- Electronic overload protection for nominal currents of 0.24 A to 63 A (whole range with only one UMC22 type). 'Set currents' selectable with parameter via fieldbus or Control Panel.
- 'Trip classes 5, 10, 20 and 30' (selectable with parameter).
- Phase-loss protection.
- Short circuit protection of the motor lines by external fuses on the line side.

Features - others

- With parameter it can be selected between 'Relays off' or 'Relays retain status' in case of automation system or fieldbus failure.
- Diagnostic informations available via LEDs, fieldbus and Control Panel.
- Preventive diagnostic functions (e.g. number of starts).
- Function blocks or similar software tools to implement in the program of the automation system.

Features / New Features (continued)

New features in comparison to preceeding versions

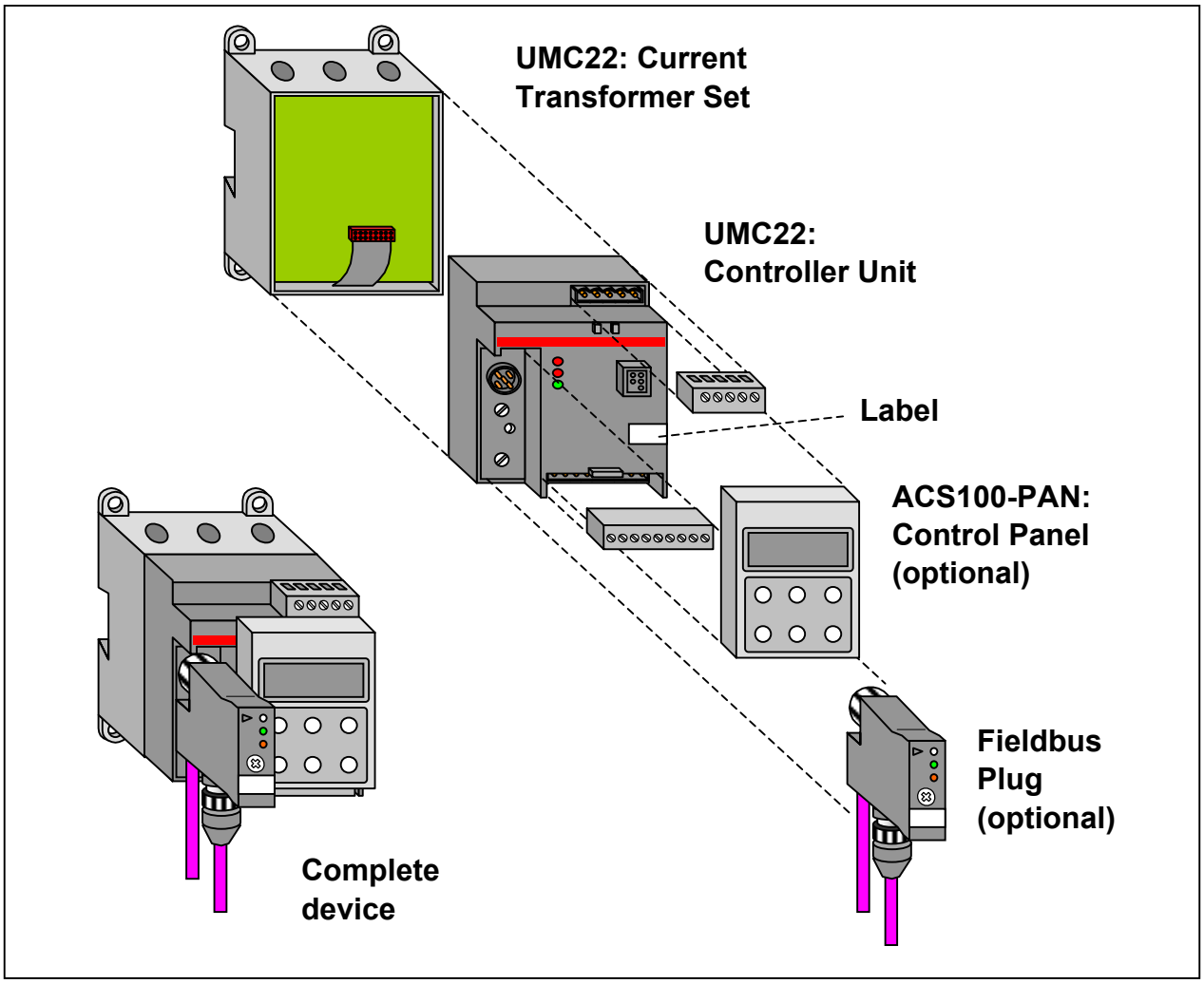
Version 3.0 ---> 3.2

- The UMC22 version 3.2 has ATEX approval. Details see chapter "Commissioning for Use of Motors in Potential Explosive Atmospheres"
  The use of the UMC22 in these applications needs a self test via Control Panel in regular time intervals, max. 3 years, and during maintenance. Details see Appendix "Control Panel" 2.7 'Self Test'.
  Additional the download of parameters by the control system can be blocked locally with the menu point 3.13 'Parameter lock'. This is mandatory for the use of motors in potential explosive atmospheres.
- Parameter 'Current factor': Monitoring of the real currents when using external current transformers and / or $\sqrt{3}$ (inner delta) circuitry. Details see chapters
  "Planning, Commissioning and Maintenance", sub clause "Motor Current = Set current versus Wiring" and "External Current Transformer for Higher Currents",
  "Data Structure on the Internal Interface", sub clause "Parameter, Detailed Description"
  and the appropriate part in the Appendix "Control Panel"
- As long as the 'Cooling Time' is running, the Control Panel display shows flashing "**°C**"
- Use of the Control Panel as Current indication:
  Menu point **Curr** does not skip back to Addr after 5 min as other menu points do.
- Better access to the Fault information via Control Panel:
  The sequence in the main menu Monitoring has changed: **Addr, Curr, FAuL**,..., see Appendix "Control Panel".
  If the FAULT info on the Control Panel is flashing --> from menu point **Curr** press only once [MENU] and [Cursor down].

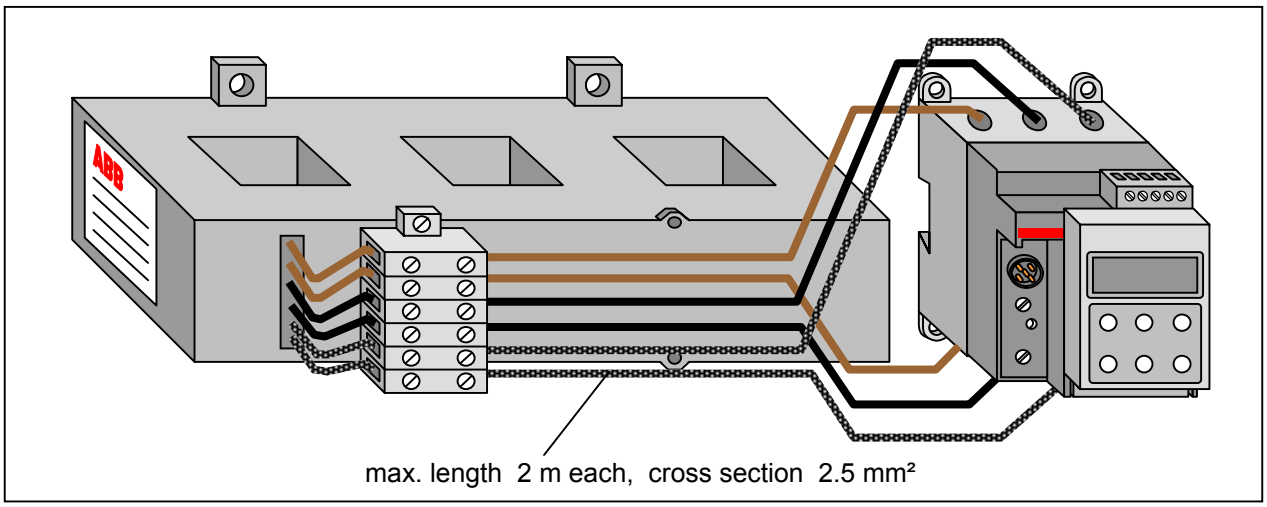
Device Construction

Overview

UMC22

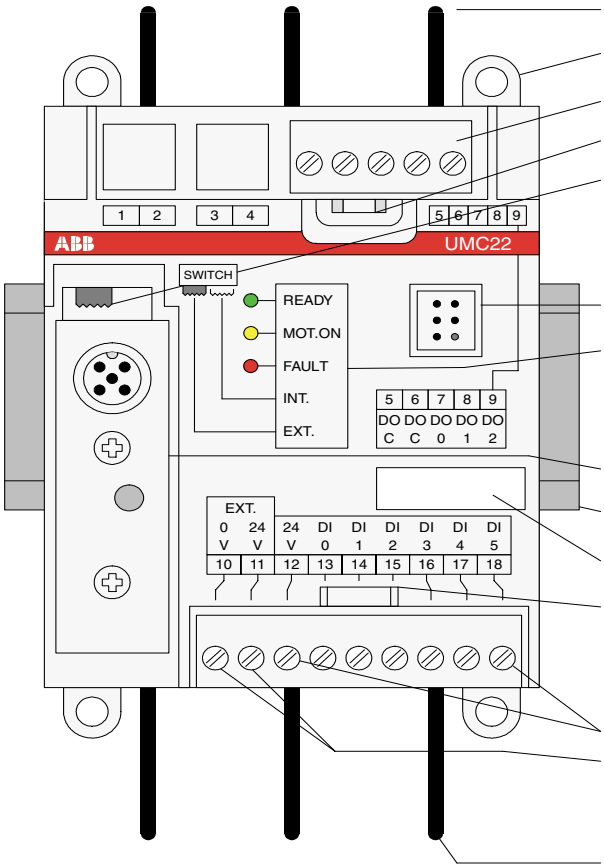


UMC22 with Current Transformer



Device Construction (continued)

Terminals, monitoring LEDs and operating elements on the front plate



Current path (for measuring the motor current)

Mounting by 4 screws M4

Connecting terminals for the digital outputs

Pawl to snap on the control unit

Switch for selecting the internal electronics supply voltage:
left position: external supply (via terminals 10/11)
right position: supply via field bus plug

Plug connection for the control panel

LEDs:

Green	READY	(for operation)
Yellow	MOT.ON	(motor on)
Red	FAULT	(overload, failure)

Connector for the FieldBusPlug

DIN rail

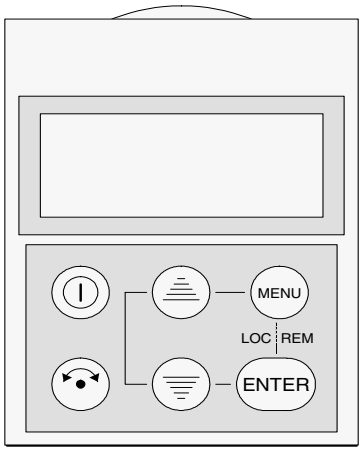
Front label, e.g. for slave address

Control panel holder. Insert the control panel at this holder then snap it into the pawl on the upper side. The electrical contacts are automatically connected.

Connecting terminals for the digital inputs

Connecting terminals for the external supply voltage (supply for internal electronics)

Current path (for measuring the motor current)



Snap-mountable control panel ACS100-PAN for monitoring and control / adjust:
- slave address
- control function
- overload parameters
- on-site diagnosis
- etc.

The control panel ACS100-PAN is not shipped together with the UMC22-FBP. It must be ordered separately.

Dimensions see chapter "Technical Data"

Planning, Commissioning and Maintenance

Guide to an Operating Installation (Overview) bold: sub clause in this chapter

Wiring and Internal 24V / 0V Connections

Hard-wire with switch apparatus and other components referring the application requirements, See chapters 'Control functions'. Example: 'Direct starter'.

Use external supply (SWITCH to EXT) if components are distant to the UMC22.

Connection of contactors

Use spark suppression, for larger contactors also interface relays to keep good lifetime of the UMC22 internal relays.

Motor Current = Set current versus Wiring

Have a look at the wiring of the motor to fix the correct 'Set current' for perfect motor protection. For $\sqrt{3}$ (inner delta) wiring the parameter "Current factor" can be changed to 1.73 to get displayed the real "Set currents" on the Control Panel and in the control system.

External Current Transformer for Higher Currents

Connect external current transformers for higher currents. Current factor see above.

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Interfacing to the Fieldbus, Addressing

Use the appropriate FieldBusPlug.
Change slave address.
The Busmaster is normally defined by the control system.

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Binding in the UMC22 as Slave on a Fieldbus, Parametrization

Load the actual slave configuration file into the programming tool. Examples: ABB-078F.GSD for PROFIBUS DP/V1, ABB_UMC22.EDS for DeviceNet.

Create fieldbus configuration together with the application program in the control system.
For some control systems dedicated function blocks or example programs are available.
Depending on the control system and the fieldbus type the ordering of the I/O signals can be made automatically, otherwice "manual" ordering is necessary.

Change parameters: Depending on the control system and the fieldbus type it is made during configuring or as apart of the control system program.
Parametrization can also be done with the Control panel. Details see Appendix: "UMC22, Control panel".

As a special feature the Control Panel allows to read the complete parameter set of an UMC22 and to transfer it to another UMC22, see Appendix "UMC22, Control Panel".

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Commissioning for Use of Motors in Potential Explosive Atmospheres

In this field of application - after setting the parameters carefully - the parameter 'Parameter lock' has to be set on the Control Panel ton 'P.loc' to hinder hazardous changes of parameters via control system.

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Switch On / Off motor, Local Control

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Info available on the LEDs
Info available on the Control Panel
Fault List

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Replacement of an UMC22 / Replacement of a Controller only

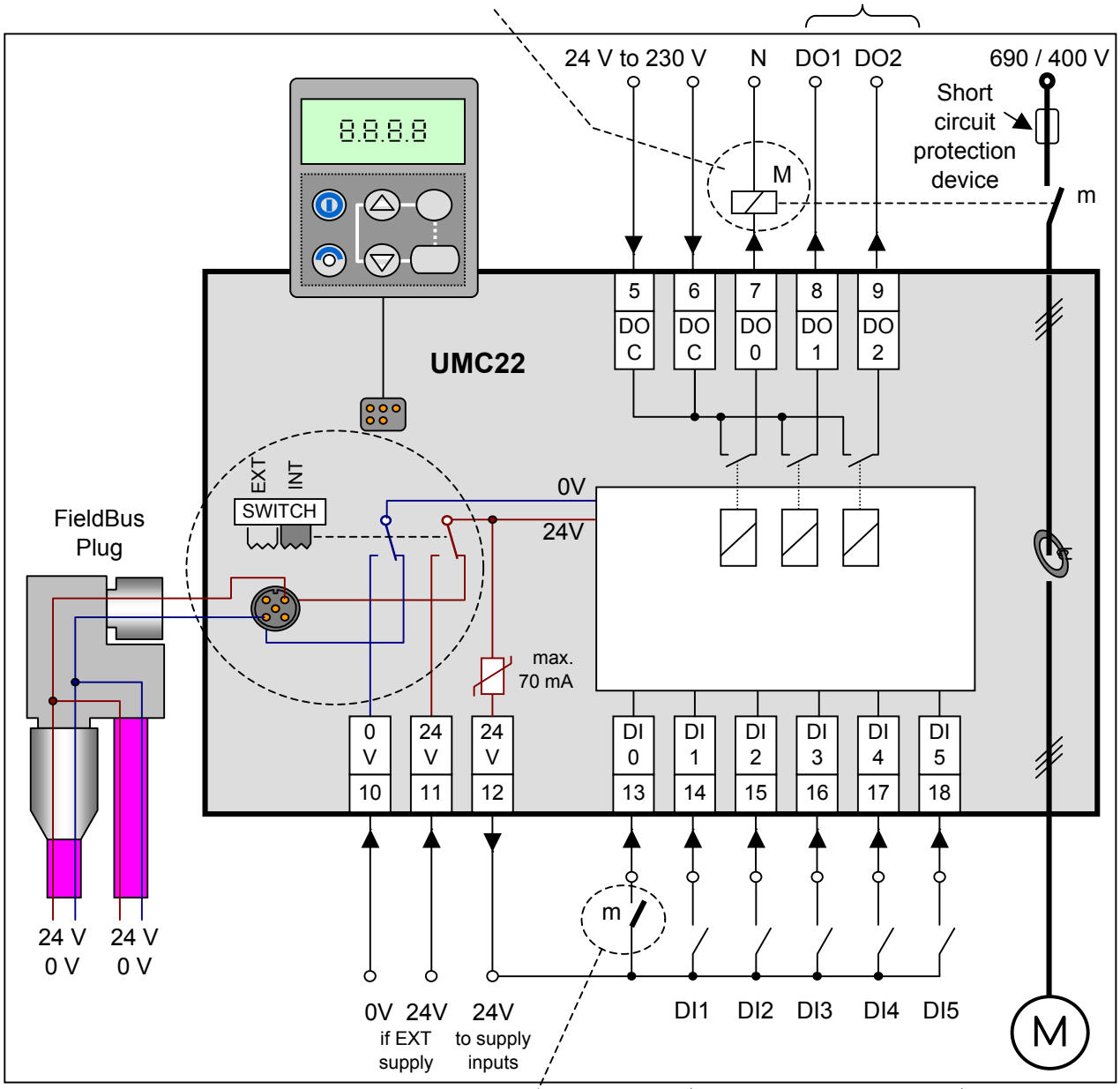
Planning, Commissioning and Maintenance (continued)

Wiring and Internal 24V / 0V Connections

Example: Direct Starter

With the parameter 'Control Function' = 'Direct Starter (3)' the relay output DO0 is used to control the main contactor

Free outputs, commands direct from fieldbus



With the parameter 'Check-back' = 'Auxiliary contacts (1)' the digital input DI0 is used to survey the contactor (default: Motor current (2))

Free outputs, monitoring signals directly to the fieldbus

Important:

Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).

Planning, Commissioning and Maintenance (continued)

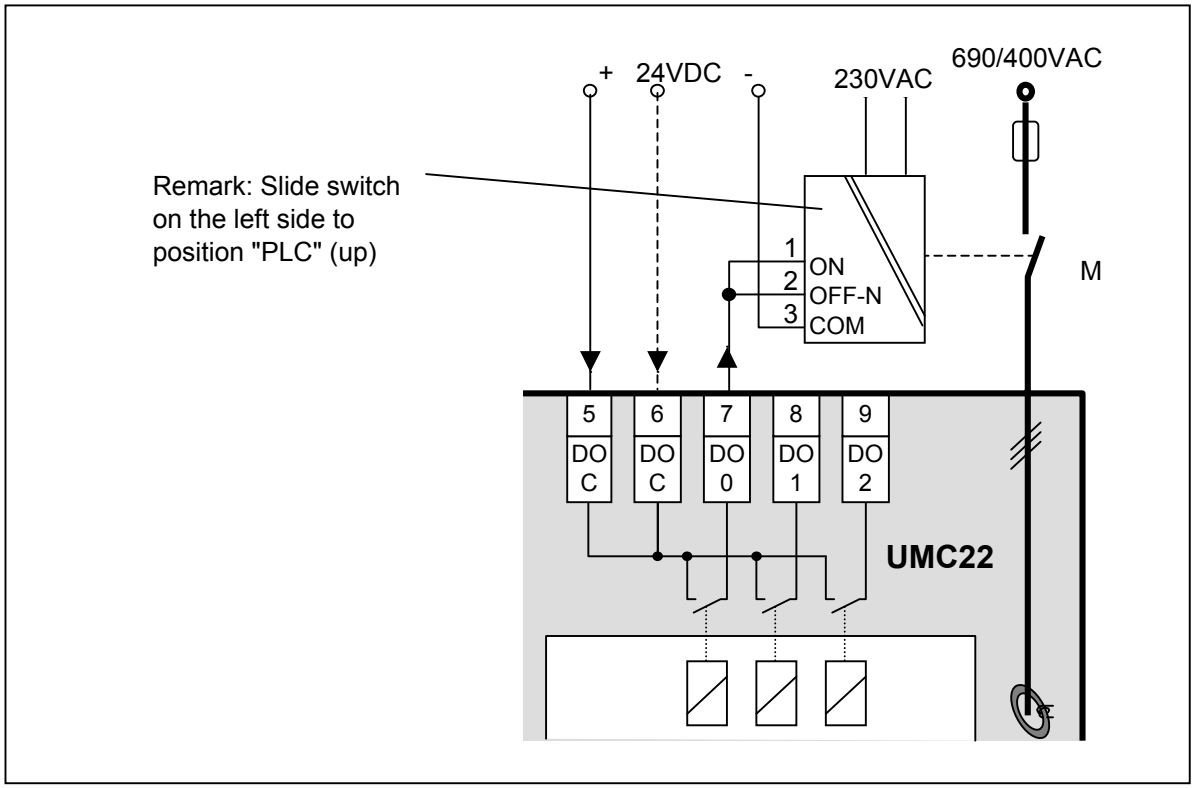
Connection of contactors

Overview of actual ABB contactors (examples)(all currents for 230 VAC)

Contactor type	Inrush current [A]	Holding current [A]	Inrush power [VA]	Holding power [VA]	VDR for spark suppression (ABB Type)	Lifetime UMC22 Relays [Switching cycles]
B6S-30-10-2,8 (coil 24V)*	0,1	0.1	2,4	2,4	-	500'000
A9, A12, A16	0.30	0.03	70	8	RV5/250	500'000**
A26, A30, A40	0.52	0.05	120	12	RV5/250	400'000**
A50, A63, A75 ****	0.78	0.08	120	12	RV5/250	300'000**
A95, A110	1.52	0.10	180	18	RV5/250	use interface relay
A145, A185	2.39	0.15	550	35	RC5-2	use interface relay
AF210, AF260, AF300***	2.04	0.04	470	10	-	500'000
AF400, 460, 580, 750***	3.8	0.05	890	12	-	500'000

* The contactor BS6-30-10-2.8 (24 VDC) is recommended as interface contactor due to its internal spark suppression.
** All values only for contactors with spark suppression, see appropriate column. Use interface contactor if higher lifetime is required.
The contactors A50 to A185 are also available with electronic interface (AF50 to AF185) with electronic interface.
*** The contactors for higher currents are available with electronic interface only.
****Interface contactor is recommended.
Remark: Spark suppression is necessary for all types except the AF types to keep resonable lifetime.

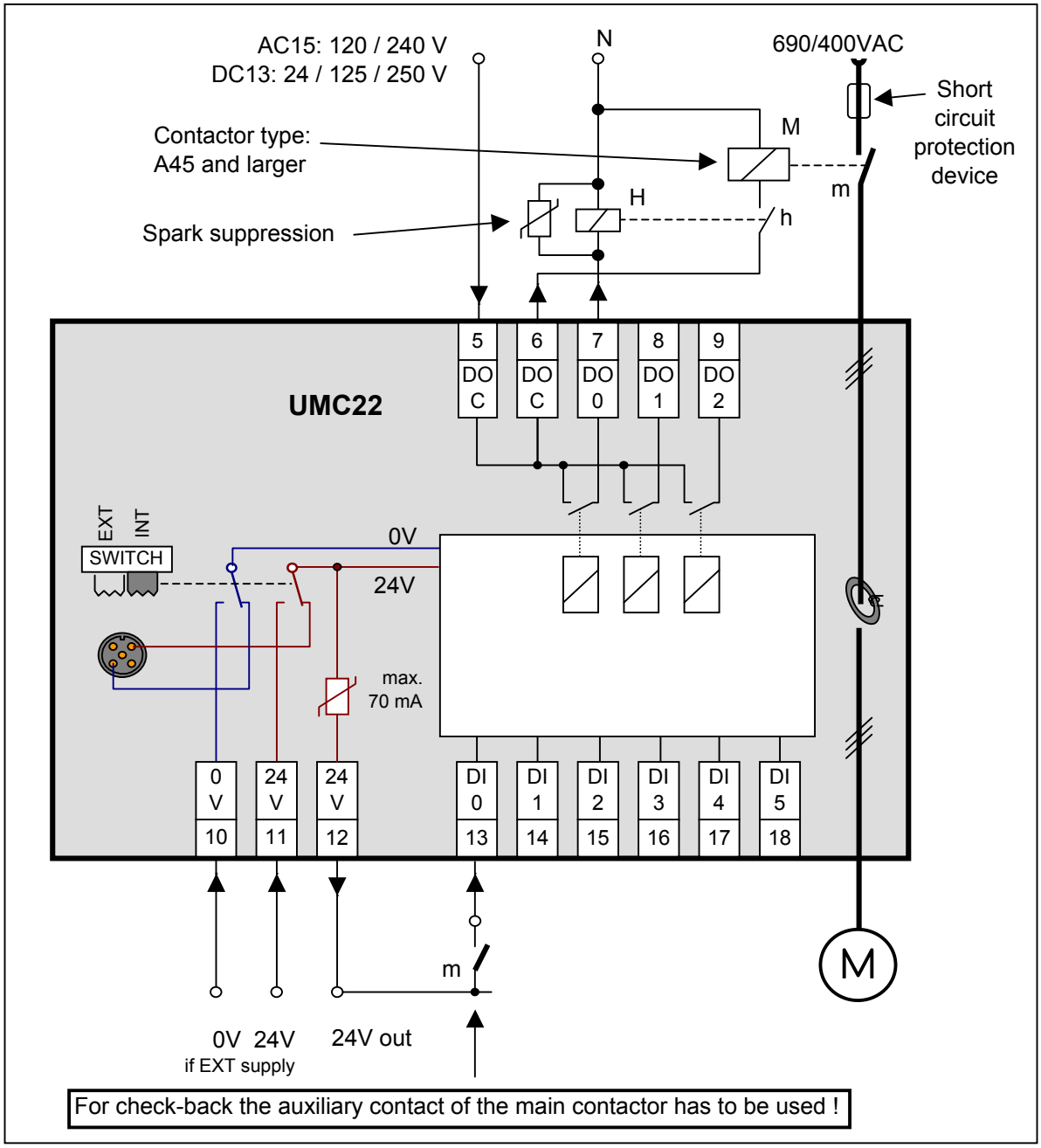
Interfacing larger contactors with electronic interface (AF types)



Planning, Commissioning and Maintenance (continued)

Connection of contactors (continued)

Interfacing contactors with peak current > 0,5 A: Types A45 and larger

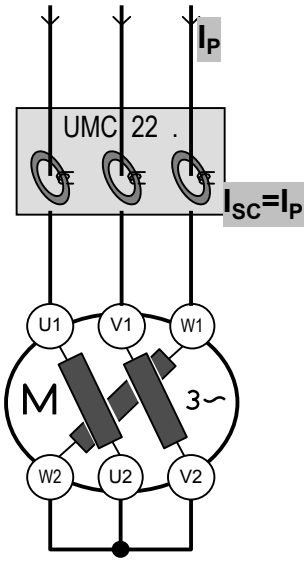


Planning, Commissioning and Maintenance (continued)

Motor Current = Set current versus Wiring

Star

Power line: 690 V



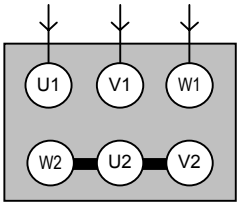
Example for motor:

Motor rating plate
400 V / 690 V
4.9 A / 2.8 A

I_P=2.8A / I_{SC}=2.8A

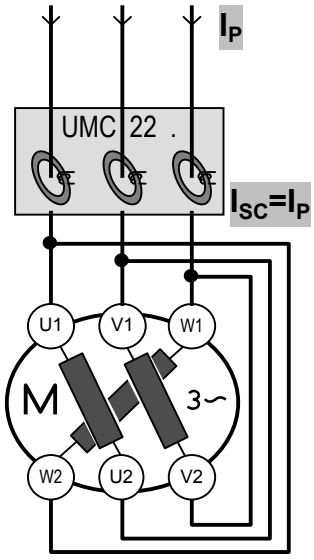
Parameter
'Set current' = 2.80

Terminal box



Delta 1 (Line)

Power line: 400 V



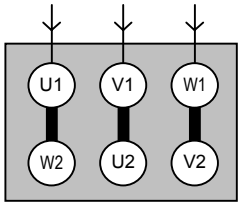
Example for motor:

Motor rating plate
400 V / 690 V
4.9 A / 2.8 A

I_P=4.9A / I_{SC}=4.9A

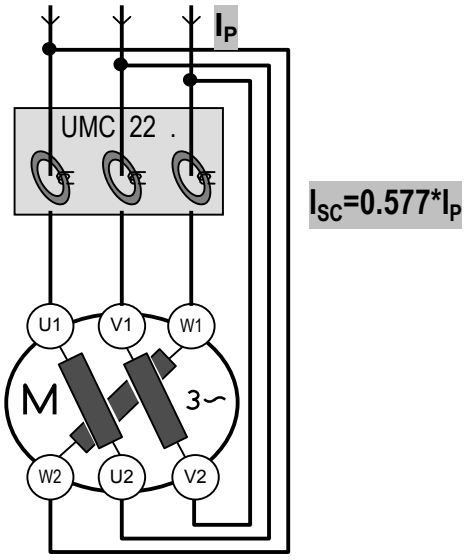
Parameter
'Set current' = 4.90

Terminal box



Delta √3 (Inner Delta)

Power line: 400 V



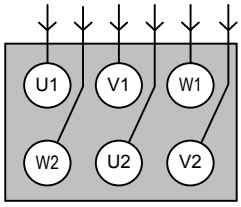
Example for motor:

Motor rating plate
400 V / 690 V
4.9 A / 2.8 A

I_P=4.9A / I_{SC}=2.8 A

Parameter
'Set current' = 2.80

Terminal box



The Delta √3 circuitry is normally used for larger motors to reduce the current transformer size.
The parameter 'Set current' is the nominal motor current devided by √3.

Planning, Commissioning and Maintenance (continued)

External Current Transformer for Higher Currents

All types of **protection current transformers class 5P10** (Standard EN/IEC60044) can be used. The selection should be made based on the requirements:

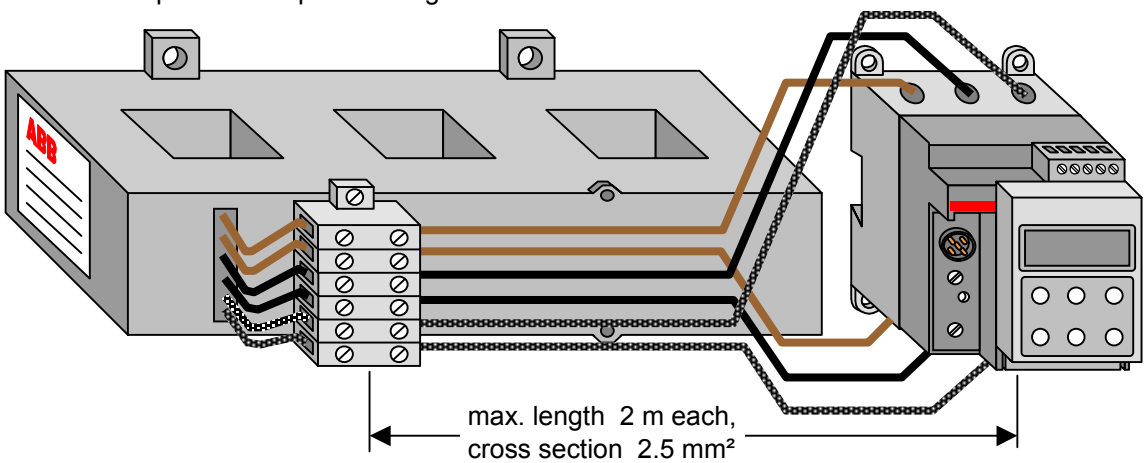
- Secondary current (= current in the UMC22) range about 5 A (recommended CTs have 4 A),
- Through-hole area if single strands are used,
- Max. burden 60 mOhm (UMC22: 30 mOhm,
  conductor: cross section 2,5mm², length 2m each: 30 mOhm)
- Requirements for current transformers referring IEC60044-1 table 11 and 14:

Measuring Current Transformer Class 1					Protection C.T. class 5P10	
actual / nominal current	5%	20%	100%	120%	100%	1000%
max. inaccuracy	3	1.5	1	1	1	5

These values must be guaranteed by the current transformer supplier. The inaccuracy is added to the inaccuracy of the UMC22.

The pass-through sense of the strands does not affect the operation.

For currents up to 850 A space saving combinations are recommended.



Type / KORC type	Recommended current range [A]		Current factor (Default = 1.0)		Secon-dary current range [A]	Hole area w*h [mm²]	max. possible core size (mm²)	Link kit (bar) type >for Contactor (order code see "Technical data") (*2)
	Star, Delta 1	Delta√3	Star, Delta 1	Delta√3				
UMC22 stand alone	0.24 - 63	0.42- 109	1	1.7	-	11 Ø	16	-
4L185 R/4	60 - 185	104 - 320	46.2	80.1	1,3 - 4	22*28	2*70² (*1)	DT450/A185 >AF145,AF185
4L310 R/4	180 - 310	312 - 537	77.5	134.2	2,3 - 4	22*28	2*70² (*1)	DT450/A300 >AF210-AF300
5L500 R/4	300 - 500	520 - 866	125	216.5	2,4 - 4	41*22	3*70² (*1)	DT500AL460S *2 >AF400,AF460
5L850 R/4	500 - 850	850-1472	212.5	368.1	2,4 - 4	41*22	-	DT500AL750S *2 AF580,AF750

(*1) Cross section has to be fixed in accordance with EN/IEC60204
(*2) Link kits for Star-Delta-Starter. Others s.catalogue)

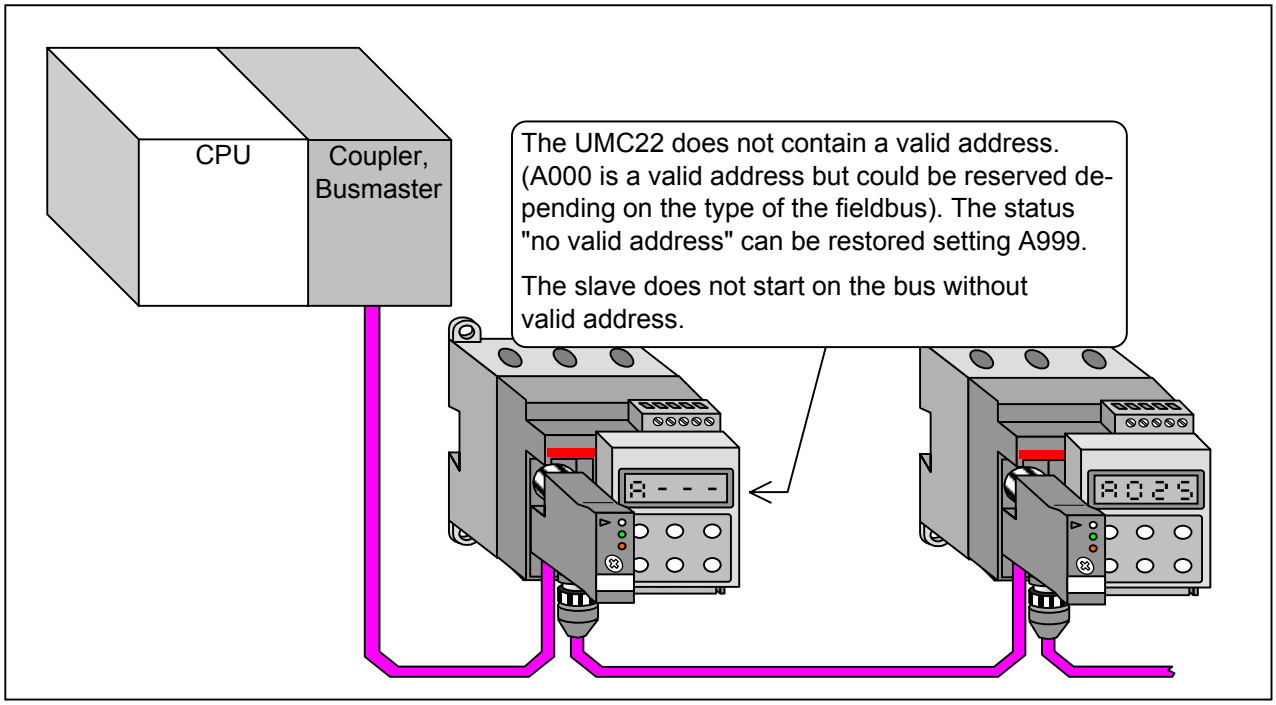
Remark: If current transformers of other suppliers are used the table above may serve as a calculation basis for the transformer factor. Example: Type 5L500 R/4 means: Primary 500 A, secondary 4 A, transformer factor 125.

Planning, Commissioning and Maintenance (continued)

Interfacing to the Fieldbus, Addressing

The normal requirement is that the slave address corresponds with the motor. That means: The slave address shall be adjusted and saved in the connected UMC22. This is possible for all fieldbuses except the AS-Interface (actual integrated AS-Interface do not allow).

To adjust the address the Control Panel can be used. Immediately when mounted or when the combination is switched on, the address is monitored. Details see chapter "Control Panel...".



An other way to adjust the address in the FieldBusPlug is to use the "Addressing Set" CAS21-FBP.0 (Interface unit + PC with addressing SW). See appropiate description.

Planning, Commissioning and Maintenance (continued)

Interfacing to the Fieldbus, Addressing (continued)

When switching on the combination UMC22<->FieldBusPlug both or one or none of them can contain a fieldbus address.

The behaviour in these cases depends on the parameter 'Address check', see chapter "Parameter, Description".

'Address check' = 'Off' (= 0) (default):

1. Neither the UMC22 nor the FieldBusPlug contains a valid address:
   - The UMC22 does not start to operate and to communicate.
2. Only the UMC22 contains a valid address:
   - The FieldBusPlug gets the address and saves it. Operation and communication starts.
3. Only the FieldBusPlug contains a valid address:
   - The UMC22 gets the address and saves it. Operation and communication starts.
4. The UMC22 and the FieldBusPlug contain the same address:
   - Operation and communication starts.
5. The UMC22 and the FieldBusPlug contain different addresses:
   - The FieldBusPlug stores the address received from the UMC22. Operation and communication starts.

'Address check' = 'On (= 1). Mainly used for Draw-out design.

This parameter can only be set via bus master and fieldbus.

1. Neither the UMC22 nor the FieldBusPlug contains a valid address:
   - The UMC22 does not start to operate and to communicate.
2. Only the UMC22 contains a valid address:
   - The FieldBusPlug gets the address and saves it. Operation and communication starts.
3. Only the FieldBusPlug contains a valid address:
   - The UMC22 gets the address and saves it. Operation and communication starts.
4. The UMC22 and the FieldBusPlug contain the same address:
   - Operation and communication starts.
5. The UMC22 and the FieldBusPlug contain different addresses:
   - Neither the operation nor the communication starts.
   - The Control Panel monitors alternating (3 seconds each):

Address of the UMC22:	A0 12
Address of the FieldBusPlug:	P0 17

   - Communication Fault (F003) is set.
   - With the Control Panel the menu *Change address* has to be selected and the desired address must be adjusted. Details see chapter "Control Panel...".
   - After leaving this menu operation and communication starts immediately. Both the FieldBusPlug and the UMC22 store the adjusted address.

     Remark: If the adjusted FieldBusPlug address is not configured in the fieldbus master the communication does not start and the red LED on the FieldBusPlug monitors Fault.

Planning, Commissioning and Maintenance (continued)

Binding in the UMC22 as Slave on a Fieldbus, Parametrization

The control systems, programming tools and the fieldbus types are totally different.

This means: **There is no common rule to configure the fieldbus master and to bind in FieldBusPlug slaves into the application program.**

Example: *(italic characters)*

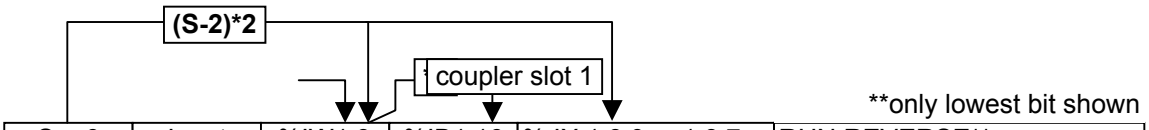
UMC22 connected to an ABB CPU type 07KT97 via PROFIBUS DP:

The appropriate configuration file is: ***ABB_078F.GSD, Version 1.4***
contains the data for all available devices on the date of origin. This means: For the PROFIBUS DP/V0 FieldBusPlug a list is offered during configuration with all devices that can be selected.

This file must be stored in the subdirectory ....AC1131\Library\PLCConf.

Other Programming Tools offer a menu point to read the .GSD configuration file, or may request separate configuration files for different devices.

With adjusting the slave address on a PROFIBUS DP/V1 bus, the order of the I/O datas in the 07KT98 CPU is defined (supposed standard ordering is selected):

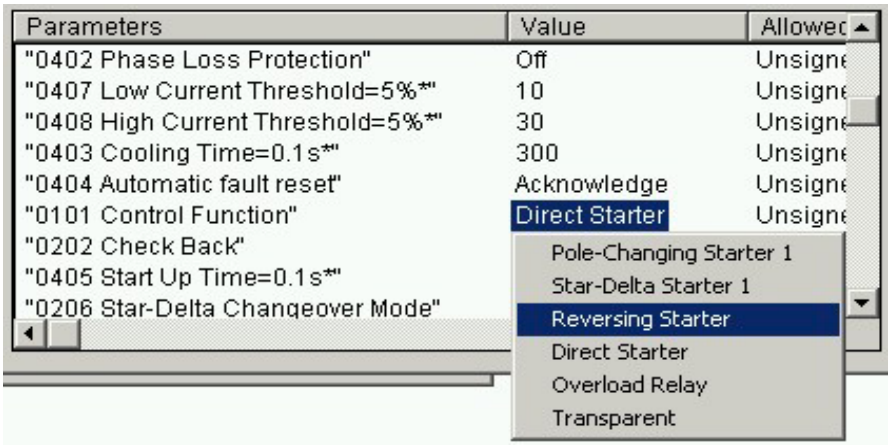


**only lowest bit shown

S = 6 Slave address	Input to PLC (Monitorings)	%IW1.8	%IB1.16	% IX 1.8.0 ... 1.8.7	RUN REVERSE**
			%IB1.17	% IX 1.8.8 ... 1.8.15	not used**
		%IW1.9	%IB1.18	% IX 1.9.0 ... 1.9.7	Motor Current, High Byte
			%IB1.19	% IX 1.9.8 ... 1.9.15	Motor Current, Low Byte
	Output from PLC (Commands)	%QW1.8	%QB1.16	%QX1.8.0 ... 1.8.7	RUN REVERSE**
			%QB1.17	%QX1.8.8 ... 1.8.15	not used**
		%QW1.9	%QB1.18	%QX1.9.0 ... 1.9.7	not used**
			%QB1.19	%QX1.9.8 ... 1.9.15	not used**

Other control systems need ordering signal by signal.

The configuring tool of the 07KT98 CPU used for PROFIBUD DP/V0 also offers the list of the parameters that can be changed:

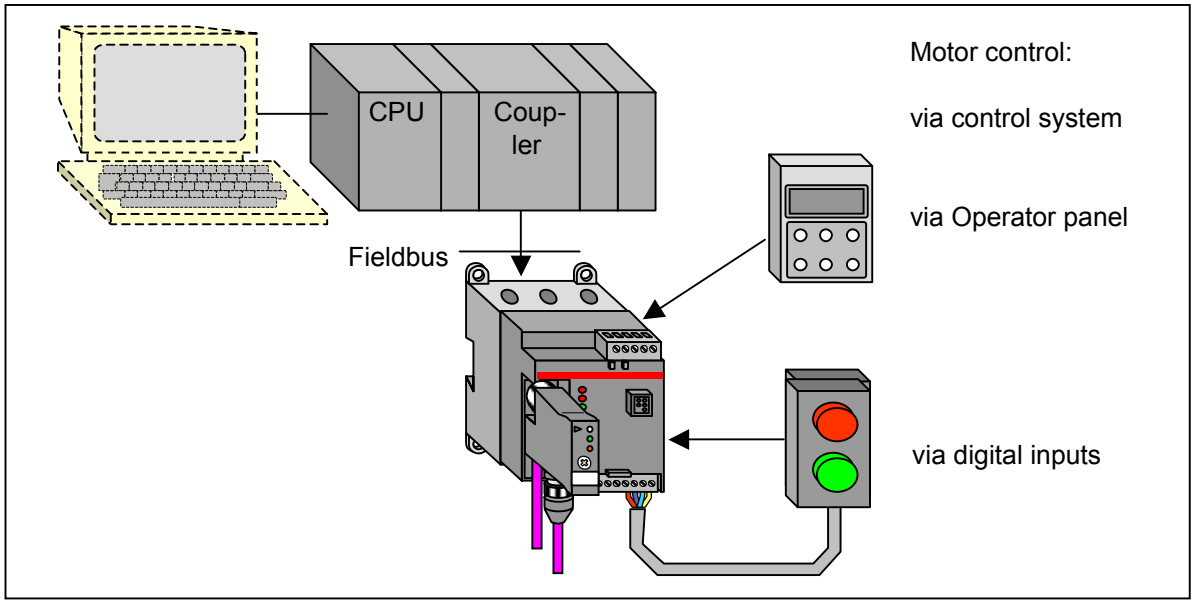


Other control systems offer more or less a similar list.

For more info consult the appropriate FieldBusPlug description.

Planning, Commissioning and Maintenance (continued)

Switch On / Off motor, Local Control



In an operating installation the motor contactors are switched On and Off normally by the control system with the commands RUN FORWARD, RUN REVERSE and OFF.
Remark: Whenever the supply voltage of the UMC22 is switched off and on the start of the motor needs a new 0 to 1 transition of the Run signal.

Switching On (Run) and Off is possible when the UMC22 is parametrized with one of the motor controlling 'Control Functions' e.g. 'Direct Starter, Star-Delta Starter etc. The exceptions are 'Transparent' and 'Overload Relay'. Switching On (Run) and Off can be done:

via control system <---> via Control Panel <---> via digital inputs

The picture next page describes the complete situation. Overview:

- Motor **Off** via:
  - Control system: Always possible and dominating.
  - Control Panel: Always possible and dominating if
    - the Control Panel is in 'Local control' mode.
  - Digital inputs: Always possible and dominating
    - if the parameter 'Local control via digital inputs' = 'On'.
- Motor **Run** via:
  - Control system: Possible if the Control system has set the command bit
    - "AUTO MODE" = 1 in the command telegram and
    - the Control panel is not active (not in 'Local control' mode).
  - Control Panel: Possible if the Control Panel is in 'Local control' mode.
  - Digital inputs: Possible
    - if the parameter 'Local control via digital inputs' = 'on' and
    - the control station releases local control setting the command bit "AUTO MODE" = 0 in the command telegram and
    - the Control panel is not active (not in 'Local control' mode).

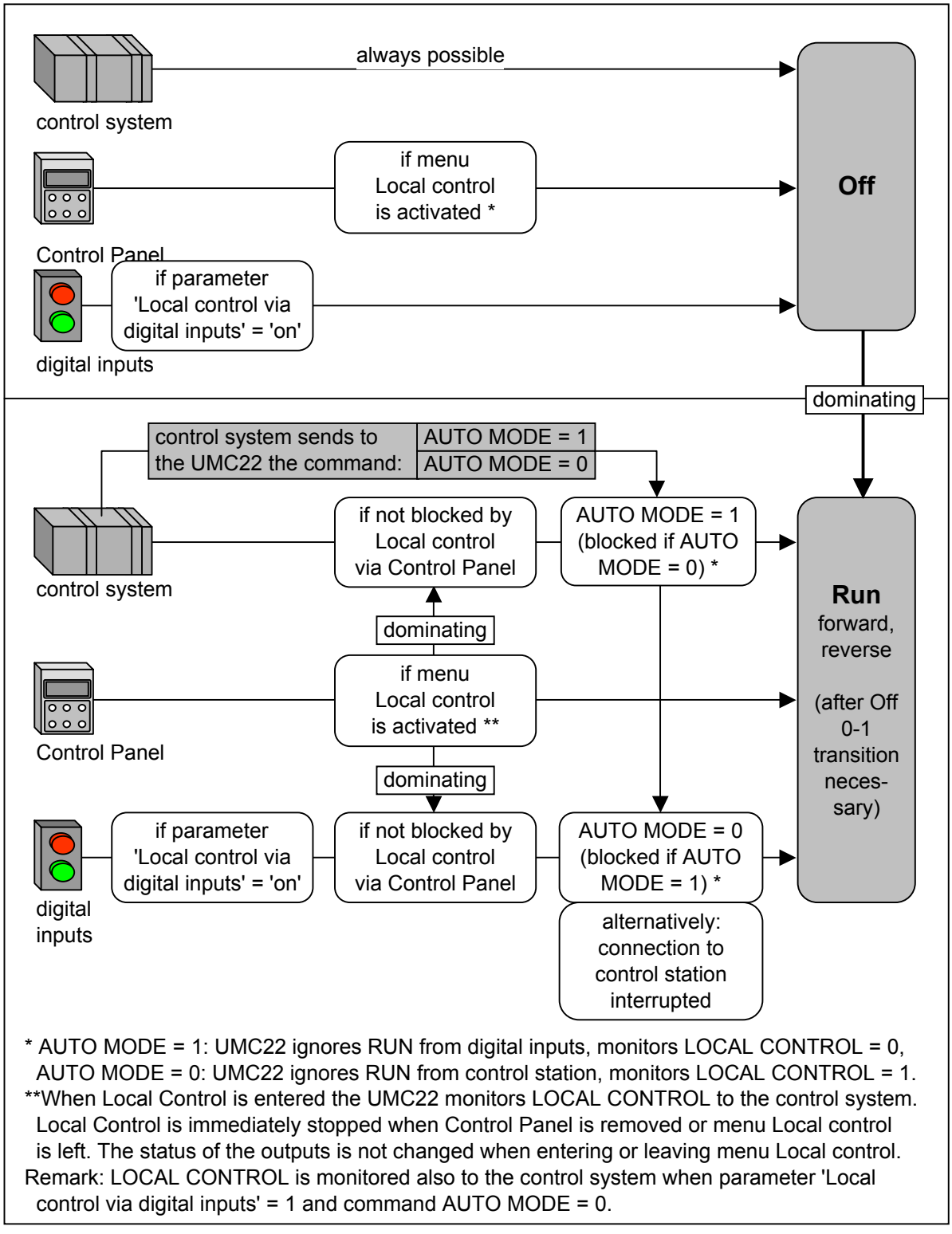
Explanation:

- Motor Off is dominating.
- The Control Panel can seize the activity under all circumstances when going to menu point 'Local control'.
- Local control via digital inputs' needs enabling by the control system with the command bit 'AUTO MODE' = 0, supposed the parameter 'Local control via digital inputs' = 'On'.
- Local control via digital inputs is automatically possible if the connection to the control system is interrupted, appropriate parametrizing supposed.

Planning, Commissioning and Maintenance (continued)

Switch On / Off motor, Local Control (continued)

Table of conditions:



* AUTO MODE = 1: UMC22 ignores RUN from digital inputs, monitors LOCAL CONTROL = 0,
AUTO MODE = 0: UMC22 ignores RUN from control station, monitors LOCAL CONTROL = 1.
**When Local Control is entered the UMC22 monitors LOCAL CONTROL to the control system. Local Control is immediately stopped when Control Panel is removed or menu Local control is left. The status of the outputs is not changed when entering or leaving menu Local control.
Remark: LOCAL CONTROL is monitored also to the control system when parameter 'Local control via digital inputs' = 1 and command AUTO MODE = 0.

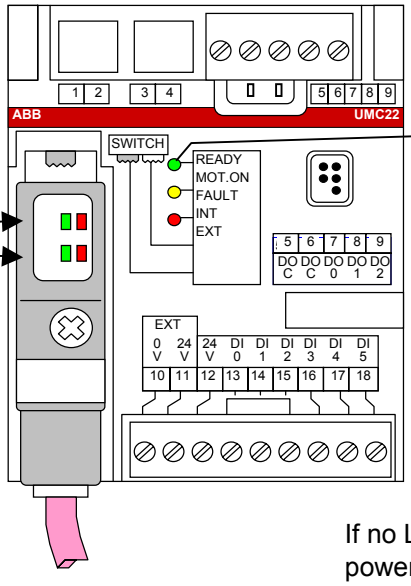
Planning, Commissioning and Maintenance (continued)

Info available on the LEDs

Connection to the fieldbus:
Caused by the definitions of the fieldbus type the meaning can differ slightly.

green = on, red = off:
normal data exchange.
green = off, red = off:
check power supply.
one of the LEDs flashing:
no Connection to the bus-master or configuration error or parameters not valid.
For more info see approriate FieldBusPlug description.

Connection to the device:
green = on, red = off:
normal data exchange.
green = off, red = off:
check power supply.
both LEDs flashing:
self test
one of the LEDs flashing:
no connection to UMC22.
For more info see approriate FieldBusPlug description.



green: ready for operation

yellow: motor running
overload,
check-back fault,
blocking
stops the motor)

red: Fault (overload, other failure)

If no LED is on check whether power is on and the SWITCH (above the FieldBusPlug socket) is on the appropriate position:
EXT if supplied via terminals,
INT if supplied via FieldBusPlug.

Remark: LEDs on the UMC22 are covered if the Control Panel is mounted. LEDs on the FieldBusPlug remain free.

Info available on the Control Panel

The Control Pannel can be mounted on the front of the UMC22 and offers access to:

- Slave address
- Status of the motor (running, off) and Status of the UMC22 inputs and outputs,
- Actual current and 'Set current',
- Detailed diagnosis information,
- Service data
- All important parameters

Additional the Control Panel allows to start and stop the motor (Local control)

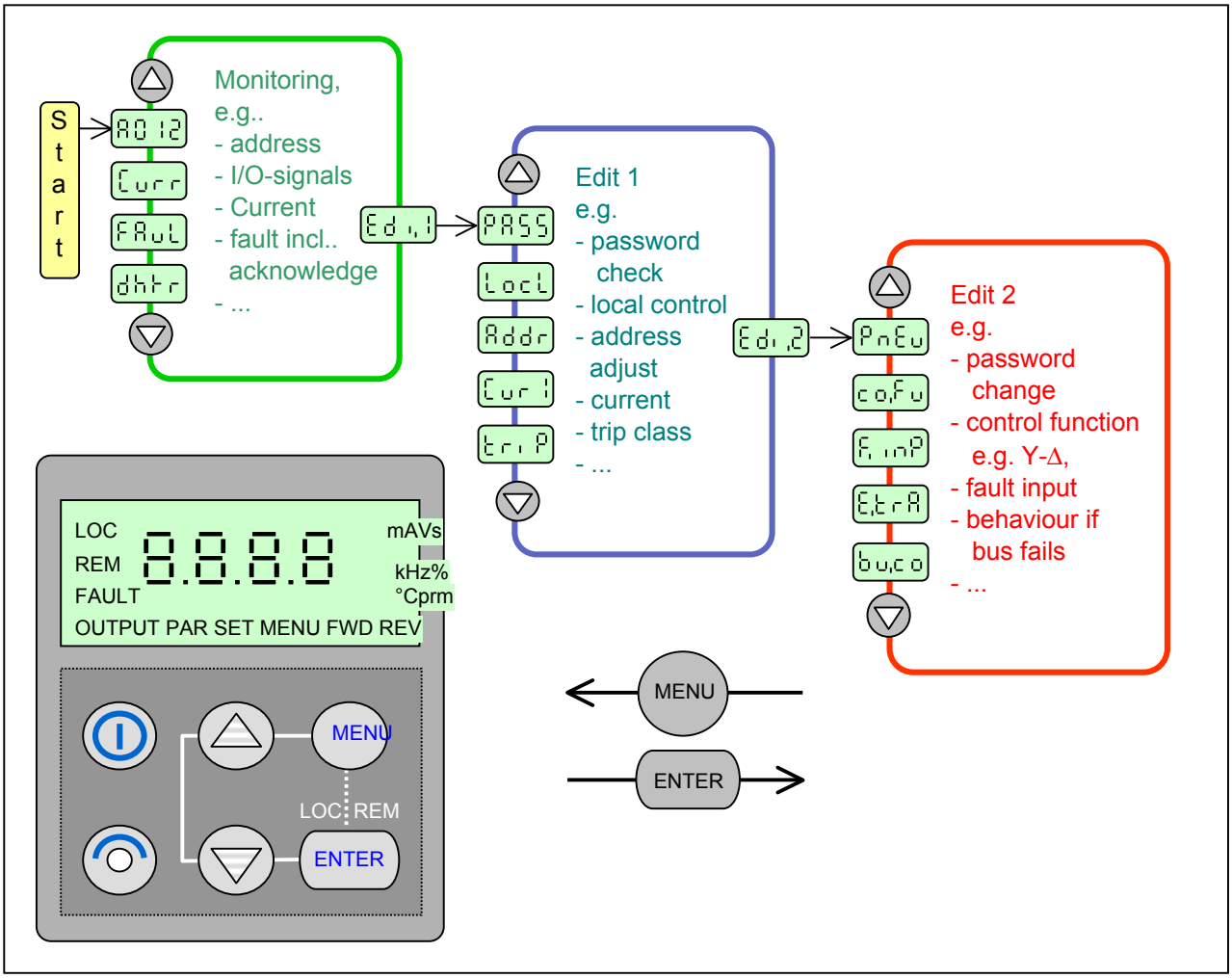
The access is arranged in three levels:

- Monitoring: Offers only to check, not to modify values and parameters
- Edit 1: Needs password and allows to change parameters during commissioning and also Local Control
- Edit 2: Accessible via Edit 1, to change parameters that are used mainly associated with the circuitry

Planning, Commissioning and Maintenance (continued)

Info available on the Control Panel (continued)

Overview of the levels



For details see appendix "UMC22, Control Panel".

Remark:

- ► Most of the changed parameters are taken over after motor off.
- ► Some parameters are taken over during power on. If changed by the Control Panel they are normally overwritten by the control system during power on.

Parameters / information that can only accessible via Control Panel

- Address (but can be changed also with separate Addressing Set CAS21-FBP.0),
- Set Operation hours, Number of starts, number of trips (control system can only read),
- Local control: Switch on and off motor (dominating against control system but needs password),
- Password,
- Bus connection: Set to off if operation without Fieldbus is desired,
- Parameter lock: Used mainly for Ex applications, blocks change of all other parameters,
- Parameter transfer: Transfer of the complete actual parameters to another UMC22,
- Parameter reset: To default, except Address, Operation hours, Number of starts and trips.

Parameters that can not be set via Control Panel:

- Blocking current threshold, Low and High current threshold,
- Start-up time (used for Blocking current threshold etc.).

Planning, Commissioning and Maintenance (continued)

Fault List

- **Monitoring telegram:**

Monitor Byte 0 Bit 6: FAULT Monitor Byte 0 Bit 7: WARNING

- **Diagnosis telegram** (detailed info see chapter "Data overview")

  Depending on the fieldbus type the busmaster requests the diagnosis telegram from the concerned slave automatically or not, see appropriate FielBusPlug description.

Fault:	Diagnosis Byte 0 Bit 7: -
Fault:	Diagnosis Byte 0 Bit 6: Self test failed
Fault:	Diagnosis Byte 0 Bit 5: Fault input signal
Fault:	Diagnosis Byte 0 Bit 4 to 0: -
Fault:	Diagnosis Byte 1 Bit 7: Overload (trip) fault
Fault:	Diagnosis Byte 1 Bit 6: Motor blocked* *depending on the parametrisation
Fault:	Diagnosis Byte 1 Bit 5: Communication fault
Fault:	Diagnosis Byte 1 Bit 4: Parameter out of range
Fault:	Diagnosis Byte 1 Bit 3: Current check-back fault*
Fault:	Diagnosis Byte 1 Bit 2: Relay 2 check-back fault*
Fault:	Diagnosis Byte 1 Bit 1: Relay 1 check-back fault*
Fault:	Diagnosis Byte 1 Bit 0: Relay 0 check-back fault*
Warning:	Diagnosis Byte 2 Bit 7: Motor current high threshold*
Warning:	Diagnosis Byte 2 Bit 6: Motor current low threshold*
Warning:	Diagnosis Byte 2 Bit 5: Parameter unknown
Warning:	Diagnosis Byte 2 Bit 4: Cooling time running
Warning:	Diagnosis Byte 2 Bit 3: Reversing lock-out time running*
Warning:	Diagnosis Byte 2 Bit 2: Self test running
Warning:	Diagnosis Byte 2 Bit 1 and 0: -
Fault:	Diagnosis Byte 3: Parameter number (out of range), see chapter "Parameter, Detailed Description"

  All faults can be acknowledged setting the Command Byte 0 Bit 6 =1 or via Control Panel, see below. The fault appears again if the faulty status is still present.

- **Control Panel** (details see Appendix "Control Panel")

  If any fault appears the FAULT signal flashes on the display. Pressing the [MENU], [Cursor down] and [ENTER] button activates the fault (FAuL) menu point. The first actual fault is displayed. With other twice [ENTER] the fault can be acknowledged.

t r i p: Overload led to trip. (°C on the display shows that the cooling time is running) F002: Motor blocked (actual current overruns 'Blocking current' for more than 1 sec F003: Communication fault F004: Parameter out of range F005: Current check back fault (no current after switching motor on)* F006: Check back fault DI2 (no signal after switching motor on) * F007: Check back fault DI1 (no signal after switching motor on) * F008: Check back fault DI0 (no signal after switching motor on) * F009: - F010: Self test failed F011: Closed circuit at DI2 interrupted.

  Particular: If the Control Panel shows alternating two addresses see chapter "Interfacing to the Fieldbus, Addressing"

Replacement of an UMC22 / Replacement of a Controller only

Replacement of an UMC22 in an operating installation

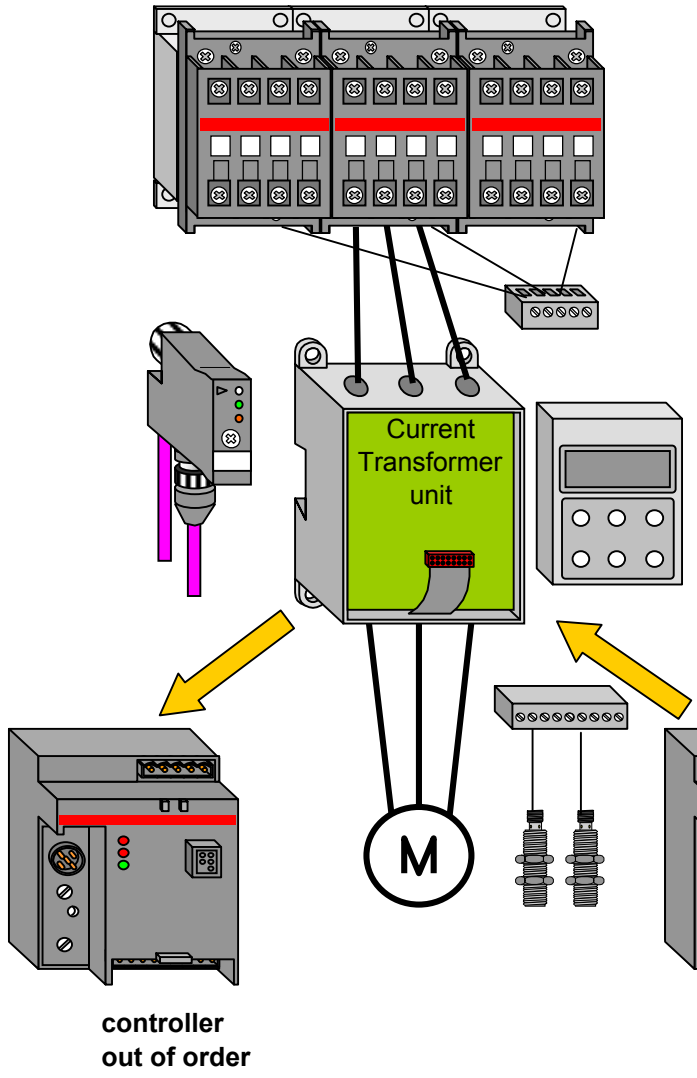
The UMC22 can be disconnected from the FieldBusPlug without disturbing the fieldbus and the other slaves. The FieldBusPlug is supplied via the voltage conducted together with the bus lines.

The FieldBusPlug keep stored the actual slave address and informs the control system that the connected device is lost.

After mounting and connecting a new UMC22, the control system will be informed that the mis-sing slave is complete again (supposed that the new UMC22 contains an invalid address A - - -).

This allows the control system to download the former parameters and to start up the new UMC22 again with correct parameters.

Replacement of the controller unit only



replace only the Controller,

---> the complete wiring, particularely the power lines, can be left unchanged

---> the parameters remain stored in the Current Transformer unit. The new Controller reads the parameters during power on *.

controller out of order

new controller

*additional the parameters can be stored also in the control system and downloaded after power on.

Remark: When the Controller is replaced only, the 'Password' is still kept in the Current Transformer unit and valid for the new combination.

Commissioning for Use of Motors in Potential Explosive Atmospheres

according to Directive 94/9/EC (ATEX)

During planning the installation of the UMC22 to protect motors in potential explosive atmospheres consult the chapter:

Planning, Commissioning and Maintenance, sub clauses:

- Wiring and Internal 24V / 0V Connections
- Connection of contactors
- Motor Current = Set current versus Wiring
- External Current Transformer for Higher Currents
- Interfacing to the Fieldbus, Addressing
- Binding in the UMC22 as Slave on a Fieldbus, Parametrization

Helpful for Commissioning and maintenance are the subclauses:

- Switch On / Off motor, Local Control
- Info available on the LEDs
- Info available on the Control Panel
- Fault List
- Replacement of an UMC22 / Replacement of a Controller only

Following chapters refer to the use of the UMC22 to protect motors in potential explosive atmospheres:		
	-	Certification
	-	Commissioning, Procedure
	-	Setting parameters
	-	Protection against unauthorized access
	-	Self Tests
	-	Fault behaviour

Certification

Referring the safety aspect the UMC22 represents a single channel device that features additional Self Tests to guarantee a safe motor protection on a high level. The UMC22 itself cannot be mounted in potential explosive atmospheres without appropriate en

The EC-type-examination Certificate Number of the UMC22 is:

II (2) GD

PTB 04 ATEX 3012

This certification includes the four current transformer types KORC 4L185R/4, 4L310R/4, 5L500R/4 and 5L850R/4 as named in the chapter "Technical Data".

Other Standards to be regarded:

EN/IEC 60079-14: Electrical apparatus for explosive gas atmospheres - Electrical installation in hazardozs areas
EN/IEC 60079-17: Electrical apparatus for explosive gas atmospheres - Inspection and maintEN/IECance of electrical installation in hazardozs areas
EN/IEC 60034-1: Rotating electrical machines, Rating ans performance

The UMC22 can not be used together with Frequency Converters and similar components.

Commissioning for Use of Motors in Potential Explosive Atmospheres (continued)

Commissioning, Procedure

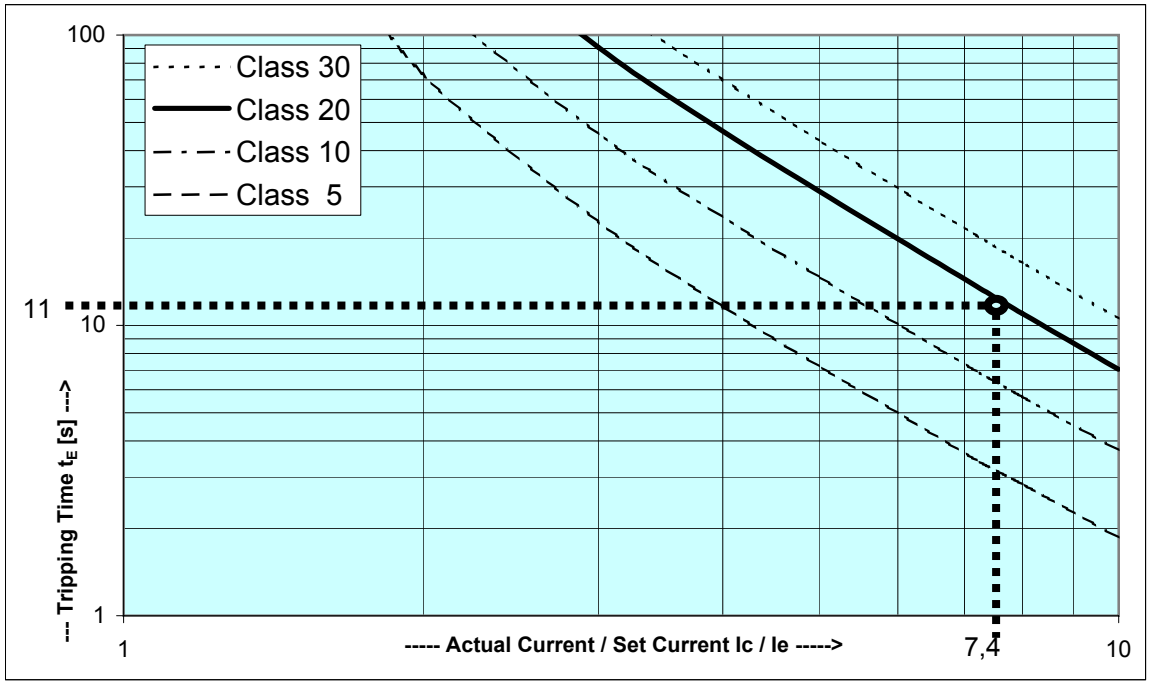
Only skilled people are allowed to commission and to parametrise installations with UMC22.

Setting parameters

The parameters that affect the safety have to be set carefully. Following all these parameters:

- **'Control Function'** = any motor control function, not 'Transparent', not 'Overload' (Default 'Transparent). If the 'Control function' is not set once the UMC22 does not start operation.
- **'Set Current 1'**, 'Set Current 2' (default = 0.5 A)
- **'Trip Class'** (Default = 10)

Motors dedicated to be used in potential explosive environment need the approval by the PTB or a similar institution.
It concerns particularely the relation breakaway starting current to nominal current **Ic / Ie** and the tripping time $\mathbf{t_p}$ that have to be named on the certificate and the motor type label.



Example: Motor with enhanced safety has the data:

Power = 7.5 kW, relation Ic / Ie = 7.4, T_E = 11 sec

The trip classes 5 and 10 are allowed because the appropriate times (3s, 6s) are below the time tE of the motor (including the tolerance 10% of the UMC22).

Tripping times for phase loss

Remark: The UMC22 trips if one phase has less than 40% of the other phases.

Trip Class	5	10	20	30
Tripping time [s] ca.	1,5 s	3 s	6 s	9 s

Commissioning for Use of Motors in Potential Explosive Atmospheres (cont.)

Setting parameters (continued)

- **'Cooling time'**, an appropriate value has to be set (default = 120 sec

  The time that has to be adjusted depends on:
  - Motor size: Larger size ---> longer cooling time
  - After trip motor still rotating or standstill (without ventilation ---> longer cooling time)
  - Environment temperature: Higher temperature ---> longer cooling time

  Regarding this situation the appropriate cooling time can be estimated. Some examples of motor cooling time-constants (motor standstill) can help:

Size	1 kW 1-pole	5 kW 1-pole	5 kW 2-pole	20 kW 2-pole	20 kW 3-pole	100 kW 3-pole
t.c.	10 min	15 min	20 min	30 min	40 min	70 min

  Remark: After three times the cooling time constant the environment temperature is nearly reached.

- Must: **'Phase loss protection'** = On = 1 (default)
- Must: **'Check-back'** = 'Motor current' = 2 (default)
- 'Automatic fault reset' = Off (= 0). With any motor control function it is definitely deactivated.
- Bus Fault Reaction' = switch Off (default) or retain status of all relay contacts as desired.

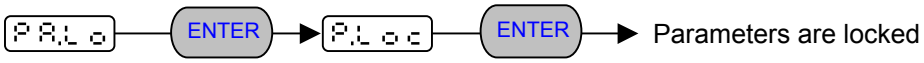
After setting these parameters they should be checked again to be sure.

Protection against unauthorized access

The access to above named parameters has to be locked locally with:

- Parameter Locked = On that can be set only locally with the Control Panel.

  Menu displayed on the Control Panel:



  This ensures that the safety related parameters are not changed via the control system per hasard or by unauthorized people.
  The parameters are stored in an EEPROM and read by the UMC22 after power on.

To disable any unauthorized abolishment the 'Parameter Locked' a password has to be set:

- Password new = not 0000. It can be set only locally via Control Panel.

Commissioning for Use of Motors in Potential Explosive Atmospheres (cont.)

Self Tests

Self Test (Power-up)

During power on the UMC22 the Power-up Self Test checks different functions such as:
- Check the check sum or similar measures in the differnt kinds of memories,
- Measuring channels etc.

Self Test (Overload)

During operation - but only if the motor is switched off - the Overload Self Test can be started, either locally via Control Panel or via the control system and the fieldbus.

- The Overload Self Test creates a trip setting the signals normally delivered by the current transformers to a high level and checking the time until the circuit trips.
- Similar to that it creates a phase loss fault and checks the correct reaction.
- All tests named under Power-up Test are carried out also.

Warning:

Starting the Overload Self Test sets the motor temperature model to zero. This means a warmed up motor is not protected correctly. The waiting time adjusted with the parameter 'Cooling Time' is not sufficient to guarantee correct motor protection.

Remark:

The Overload Self Test runs about 10 seconds until it has finished.
When the Control System starts the Overload Self Test it has to check whether the start has happened reading the bit Self test in the diagnosis telegram. Similar for the Control panel, shows "buSY" as long as the Overload Self Test is running.
The Overload Self Test must be started at least all 3 years and during maintenance, but additional during operation as often as the particular application requests.

Fault behaviour

If any Self Test detects a fault,

- the operation is not started, output relays are not switched on,
- the internal fault bit is set, following the monitoring signal FAULT is sent to the fieldbus, the red LED lights on and the FAULT signal on the Control Panel display flashes.
- if the parameter 'Fault output' = On the relay output DO2 switches on.

The fault bit cannot be resetted neither with the Control Panel nor via the control system. Indeed a power-on resets the fault signal but the Power-up Self Test normally detects the fault if it is still present.
In this case the UMC22 must be sent to the supplier. It is not allowed to disassemble devices used for applications as described in this chapter.
Replacing only the Controller does not help to by-pass the password because it is saved in the current transformer part also.

Data Structure on the Internal Interface

(interface to the FieldBusPlug)

Device Configuration

		Type	Number	Bits per signal
Cyclic data	**Monitored Signals**	DI = Digital Input	16 bits	1
		AI = Analog Input	1 word	word=16 bit
	Commands	DO = Digital Output	16 bits	1
		AO = Analog Output	0	word=16 bit
Acyclic data	**Diagnosis**	Diagnosis	32 bits	1
	Parameters	Parameter	26	differnt sizes
	Product code*	0x2AFBH = 11003'	-	-

*Identifier for the UMC22 on the fieldbus, necessity depends on the fieldbus type

Commissioning: Data Handling Procedure

Preparation before first power up on the UMC22:
- Set slave address (only via Control Panel),
- Load parameters into the UMC22,
- Activate downloaded parameter 'Control function' with another power off/on (other parameters are activated with 'motor off/on or power on),
- Motor can be switched on.

Next power up:
- UMC22 starts with actual parameters,
- Motor can be switched on after start sequence.

For the use of motors in potential explosive atmospheres consult chapter "Commissioning for Use of Motors in Potential Explosive Atmospheres"

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data Overview

Digital Inputs DI ** (Monitored Signals, sent from the UMC22 to the control system)

Bit No.	7	6	5	4	3	2	1	0
Byte No.0	**WARNING**	**FAULT**	**LOCAL CONTROL**	**REVER-SING LOCK-OUT TIME**	**-**	**RUN FORWARD**	**OFF**	**RUN REVERSE***
Byte No.1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	-	-

Analog Inputs AI (Monitored Signals, sent from the UMC22 to the control system)

Wrd No.	Byt No.	Group	Byte weight	Definition / Range	Default value	Default (digital)	take-over after
0	**0**	**MOTOR CURRENT**	low				
	1	**(% of Set current)**	high				

Digital Outputs DO (Commands, sent from the control system to the UMC22)

Bit No.	7	6	5	4	3	2	1	0
Byte No.0	-	**FAULT RESET**	**AUTO MODE**	**-**	**SELF TEST**	**RUN FORWARD**	**OFF**	**RUN REVERSE**
Byte No.1	**DO2*** (UMC output)	**DO1*** (UMC output)	**DO0*** (UMC output)	-	-	-	-	-

* some signals are used depending on the parameter 'Control function'

** Some fieldbuses transfer Digital Input signals together with Analog Input signals in words.

Diagnosis (Monitored Signals, sent from the UMC22 to the control system)

Bit No.	7	6	5	4	3	2	1	0
Byte 0	**-**	**Self test failed**	**Fault input signal**	-	-	-	-	-
Byte 1	**Overload (trip) fault**	**Motor blocked***	**Commu-nication fault**	**Parameter out of range**	**Current check-back fault***	**Relay 2 check-back fault***	**Relay 1 check-back fault***	**Relay 0 check-back fault***
Byte 2	Motor current high threshold*	Motor current low threshold*	Parameter unknown	Cooling time running	Reversing lock-out time running*	Self test running	-	-
Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data Overview (continued)

Parameters: Single Parameter Transfer Using the Numeros of the Parameters

Para No.	Nr.of Byte	Group	Definition / Range	Default value	Default (digital)	take-over after
01	4	Set current 1	0.24 - 3200.00 A	0.5A	50	motor off
02	2	Current factor	1 - 640	100% = 1	100	motor off
03	4	Set current 2	0.24 - 3200.00 A	0.5A	50	motor off
04	1	Trip class	Class 5 - 30	Class 10	10	motor off
06	1	Phase loss protection	0=Off, 1=On	1 = On	1	motor off
08	1	Low current threshold	30 - 100% *Is,step 5%	50%	10	motor off
09	1	High current threshold	100-800% *Is,step 5%	150%	30	motor off
10	2	Cooling time	30 - 3600s, step 0,1s	120 s	1200	motor off
11	1	Automatic fault reset	0=Off, 1=On	0 = Off	0	motor off
12	1	Control Function	see detailed descript.	1=Transp.	1	power up
13	1	Check-back	1=Aux.cont, 2=Curr.	2=Current	2	motor off
14	2	Start-up time	0 - 600s, step 0,1s	120s	1200	motor off
15	1	Star-delta changeover mode		1=Current	1	motor off
16	2	Star-delta starting time	1 - 3600s, step 0,1s	60 s	200	motor off
17	2	Reversing lock-out time	0.2 - 3600s, step 0,1s	2s	20	motor off
18	2	Operating hours of motor	0 - 65'535, step 1h	0	0	-
19	4	Number of starts	0 - 1000'000, step 1	0	0	-
20	1	Bus fault reaction	0=Rel.off, 1=retain	0=Rel.off	0	motor off
21	1	Fault input	0=Off, 1=On	0 = Off	0	motor off
22	1	Local control via digital inputs	0=Off, 1=On	0 = Off	0	motor off
23	1	Blocking current threshold	0 - 800% * Is, step 5%	800%	160	motor off
24	1	Fault output	0=Off, 1=On	0 = Off	0	motor off
25	1	Number of trips	0 - 255, step 1	0	0	-
26	1	Address check	0=Off, 1=On	0 = Off	0	power up

Detailed description see sub clause "Parameter, Detailed Description"

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data Overview (continued)

Parameters: Transfer of the Complete Parameter Set in one Block (Block transfer)

Wrd No.	Byt No.	Group	Byte weight	Definition / Range	Default value	Default (digital)	take-over after
0	0	Set current 1	low	0.24 - 3200.00 A	0.5A	50	motor off
	1						
1	2						
	3		high				
2	4	Current factor	low	1 - 640	1	1**	motor off
	5		high				
3	6	Set current 2	low	0.24 - 3200.00 A	0.5A	50	motor off
	7						
4	8						
	9		high				
5	10	Trip class		Class 5 - 30	Class 10	10	motor off
	11	reserved		-	-	-	-
6	12	Phase loss protection		0=Off, 1=On	1 = On	1	motor off
	13	reserved		-	-	-	-
7	14	Low current threshold		30 - 100% *Is,step 5%	0,5	10	motor off
	15	High current threshold		100-800% *Is,step 5%	1,5	30	motor off
8	16	Cooling time	low	30 - 3600s, step 0,1s	120 s	1200	motor off
	17		high				
9	18	Automatic fault reset		0=Off, 1=On	0 = Off	0	motor off
	19	Control Function		see detailed descript.	1=Transp.		power up
10	20	Check-back		1=Aux.cont, 2=Curr.	2=Current	2	motor off
	21	Start-up time	low	0 - 600s, step 0,1s	120s	1200	motor off
11	22		high				
	23	Star-delta changeover mode			1=Current	1	motor off
12	24	Star-delta starting time	low	1 - 3600s, step 0,1s	60 s	200	motor off
	25		high				
13	26	Reversing lock-out time	low	0.2 - 3600s, step 0,1s	2s	20	motor off
	27		high				
14	28	Operating hours of motor	low	0 - 65'535, step 1h	0	0	-
	29		high				
15	30	Number of trips		0 - 255, step 1	0	0	-
	31	reserved		-	-	-	-
16	32	Number of starts	low	0 - 1000'000, step 1	0	0	-
	33						
17	34						
	35		high				
18	36	Address check			0 = Off	0	power up
	37	Bus fault reaction		0=Rel.off, 1=retain	0=Rel.off	0	motor off
19	38	Fault input		0=Off, 1=On	0 = Off	0	motor off
	39	Local control via digital inputs		0=Off, 1=On	0 = Off	0	motor off
20	40	Blocking current threshold		0 - 800% * Is, step 5%	800%	160	motor off
	41	Fault output		0=Off, 1=On	0 = Off	0	motor off

Detailed description see sub clause "Parameter, Detailed Description"

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data, Detailed Description

Monitored Signals (description)

RUN REVERSE	1: motor running reverse AND check-back (current/contact) = 1
OFF	1: motor stopped AND no current is flowing AND no run command is active 0: run command is active OR current is still flowing after off command
RUN FORWARD	1: motor running forward AND check-back (current/contact) = 1
LOCK-OUT TIME	1: Lock-out time running. Only for Reversing starter / Starts with OFF command. The command of the opposite direction is accepted only when Reverse lock-out time' is over.
LOCAL CONTROL	1: Local control is activated via Control panel or digital inputs. RUN commands of the control system are ignored. 0: The control system can switch on with RUN commands. Details see chapter "Planning and Commissioning", "Switch On / Off motor, Local Control"
FAULT	1: Any Fault condition exists: Overload, no 'Check-back' when started, etc. See Diagnosis, Fault Bytes 0 and 1. must be acknowledged via fieldbus command FAULT RESET or with Control panel.
WARNING	Any warning exists. See Diagnosis, Warning Byte 2
UMC input DI0...DI5	Reads UMC digital inputs DI0 ...DI5, independent of the parametrizing
Motor current (Analog Input)	Motor current of the largest loaded phase as a % of 'Set current'

Commands (details)

RUN REVERSE	0-1 transition: Motor starts running reverse or with speed 2
OFF	1: Motor stops as long as this signal is 1. OFF dominates RUN commands.
RUN FORWARD	0-1 transition: Motor starts running forward or with speed 1. Remark: To start the **opposite direction** of a Reverse starter an OFF command is necessary. OFF starts immediately the reverse lock-out time. When the reverse lock-out time has elapsed, the motor can be started with the 0-1 transition of the opposite / different RUN command. Change of the speed of a Pole-changing starter is possible immediately.
SELF TEST	0-1 transition: Internal test of the HW and SW starts (memorys, measuring channels etc.). The Self Test can only be started when the motor is Off otherwise the signal Self test failed is set. **Important: Starting the Self Test resets the calculated motor temperature to zero!**
AUTO MODE	0: Enables start of the motor (Run) via digital inputs on the UMC22, supposed the parameter 'Local control via digital inputs' is set. Details see chapter "Commissioning", "Switch On / Off motor, Local Control". UMC22 ignores RUN command from control station. Off is always possible.
FAULT RESET	0-1-transition: Resets all resetable faults (overload fault, check-back fault, etc.)
UMC output DO0...2	Transparent control of UMC digital output DO..., if not used by any 'control function' different from 'Transparent'.

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data, Detailed Description (continued)

Diagnosis

Bit Nr.	7	6	5	4	3	2	1	0
Fault Byte 0	**-**	**Self test failed**	**Fault input signal**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked***	**Commu-nication fault**	**Parameter out of range**	**Current check-back fault***	**Relay 2 check-back fault***	**Relay 1 check-back fault***	**Relay 0 check-back fault***
Warning Byte 2	Motor current high threshold*	Motor current low threshold*	Parameter unknown	Cooling time running	Reversing lock-out time running*	Self test running	-	-
Fault Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

*if activated by appropriate Control function'

Diagnosis: Faults (Byte 0, 1 and 3)

Fault input signal — 1: Input gets fault signal from external module, e.g. thermistor module. DI2 = 1: no external fault, DI2 = 0 sets Internal fault signal. See 'Attached control

Self test failed — 1: Self test has failed or was started during motor running.

Relay 0 check-back fault — 1: no signal from auxiliary contact within 300 ms after switching on the contactor with output DO0. Also fault: Signal from auxiliary contact if not switched on. See Attached control function. 'Check-back'.

Relay 1 check-back fault — 1: dto, contactor on DO1

Relay 2 check-back fault — 1: dto, contactor on DO2

Current check-back fault — 1: no motor current within 300 ms after switching on contactor. Also fault: Current before switching on the motor.

Parameter out of range — 1: Received parameter exeeds high or low limit (the accompannying parameter number is shown in Byte 3).

Communication fault — 1: UMC22 does not receive valid telegramms (control system, fieldbus or FieldBusPlug is out of order or interrupted). Remark: Is sent to the control system after reconnection.

Motor blocked — 1: Motor current over blocking current threshold. See 'Overload Protection' - 'Blocking current threshold'.

Overload (trip) fault — 1: Trip due to thermal protection or phase loss.

Parameter number — #: Number of the parameter which exeeds the high or low limit

Diagnosis, Warnings (Byte 2)

Motor curr.above high threshold — 1: Motor current is above the High threshold current. See Attached control function 'High current threshold'.

Motor curr.below low threshold — 1: Motor current is below the low threshold current. See Attached control function 'low current threshold'.

Parameter unknown — 1: A numero above 27 is used (only possible for fieldbus types that allow to write and read single parameters)

Cooling time running — 1: Cooling time is running.

Reversing lock-out time running — 1: Reversing lock-out time is running.

Self test running — 1: Self test is running

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Data, Detailed Description (continued)

Parameters, Functionality (Overview)

The parameters are arranged into groups that apply for:

* Application circuit diagram:
  - 'Control function':
    Transparent', 'Direct Starter', 'Star-Delta Starter', 'Positioner' etc.
    (Descriptions with wiring etc. referring to the particular 'Control function' see Appendix A:
  - 'Attached control functions':
    Local control via digital inputs',
    Check-Back': Via: 'Current', 'Auxiliary contacts', 'Simulation'
    etc.
    (see chapters "Parameter....." and appendices).

* 'Current setting'
  - 'Set current 1',
  - 'Set current 2' (two-speed),
  - 'Factor for external current transformer'.

* 'Overload protection', e.g.
  - 'Trip class' (5, 10, 20, 30).
  - 'Cooling time' (seconds)
  - 'Blocking current threshold', ...
  - etc.

* 'Communication fault reaction' (reaction on loss of communication to control system)

* not parameters but service supporting data: 'Other Info':
  - 'Operating hours'
  - 'Number of starts'

To load parameters into the UMC22 different ways are possible depending on the fieldbus and the control system:

* The slave configuration file (e.g. GSD file for PROFIBUS DP) contains the parameters. The parameters are changed during configuration of the fieldbus and are loaded in the UMC22 during switching on (block transfer, see below).
* The slave configuration is made via particular functions or tools of the control system e.g. EDS file (DeviceNet) or FDT/DTM (PROFIBUS DP/V1; normally single parameter transfer).
* The parametrization is done via "handmade" application program of the control system (Single parameter or complete block transfer, see below)
* The Control Panel allows to set most of the parameters. Details see Appendix: UMC22, Control Panel.
* As a special feature the Control Panel can be used to read the complete parameter set of a parametrized UMC22 and to transfer it to another UMC22, see Appendix UMC22, Control Panel.

Remark:
Some parameters are taken over with *power up*, others during *motor off*.
Refer to chapters "Parameters....."

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Parameter, Detailed Description

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Group	Definition / Range	Select.No.	UMC behaviour; description	Param.No.	Adr.Offset	Nr.of Bytes	Default (value)	Default (digital)	take-over
Control Function		co.Fu		12	19	1			
	Transparent	1	Direct access to DIs / DOs via fieldbus				1	1	power up
	Overload Relay	2	Similar to overload relay. Attention: Normal signal on output DO0 is On, connected contactor starts the motor.						
	Direct Starter	3	Direct starter with check-back						
	Reversing starter	4	Reverse starter with check-back						
	Star-Delta starter 1	5	Star-delta starter via 2 DOs, with check-back						
	Pole changing starter 1	6	Pole changing start witch check-back						
Attached Control Functions									
Local control via digital inputs	Off On	L.c t r 0 1	Off: No control via digital inputs On: Digital inputs prepared to control RUN / OFF locally. Remark: Off Input DI5 needs closed-circuit signal Conditions see chapter "Planning, Commissioning and Maintenance", sub clause "Switch On / Off motor, Local Control"	22	39	1	0	0	during motor off
Check-back	Auxiliary contacts Motor current Simulation	bA.ch 1 2 3	Aux...: ok when auxiliary contacts are closed 300 ms after start Cur....: ok when current >40% of I_s is present 300 ms after start Sim...: simulated check-back (e.g. for test without motor). Simulation' is recommended only to be set via Control Panel, the control system must only set 'Auxiliary contacts' or 'Motor current' to guarantee for an operating check-back after next power on.	13	20	1	2	2	during motor off
Fault input	Off (not activated) On (activated)	F.i nP 0 1	UMC22 input DI2, Closed-circuit signal. 1 = ok, 0 sets internal Fault signal	21	38	1	0	0	during motor off
Fault output	Off (not used) On (uses DO2)	F.out 0 1	On: Digital output DO2 used to monitor the Fault signal	24	41	1	0	0	during motor off
Reversing lock-out time	0.2 - 3600s, step 0,1s	t i.r L	Only for bidirectional starters! - Starts with OFF (OFF is necessarry between FORWARD and REVERSE) - Command 'RUN' in other direction is not accepted while lock-out time is running. (0 on the Control Panel means 0,2 s)	17	26	2	2s	20	during motor off

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Parameter, Detailed Description (continued)

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Group	Definition / Range	Selection No.	UMC behaviour; description	Param.No.	Adr.Offset	Nr.of Bytes	Default (value)	Default (digital)	take-over
Attached Control Functions									
Star-delta changeover mode	Time Current	Sd.ch 0 1	Only for Star-delta starter. Change star--->delta, when: - Time: star-delta starting time is over - Current: motor current =< 0,9 * I_s Remark: Current check-back fault is generated if the Star-delta starting time has elapsed before switching to Delta.	15	23	1	1	1	during motor off
Star-delta starting time	1 - 3600s, step 0,1s	Sd.St	only for Star-Delta Starter, starts running with the RUN command	16	24	2	60 s	200	d.mot. off
Current Settings									
Current factor	Allowed factors: old) **1** refers to **1.00** 1) **100** refers to **1.00** 2) **173** refers to **1.73** 3) **1000 - 64000** refer to **10.00 - 640.00**	Cu.FA	The UMC22 measures the currents of the lines in the bushing holes. √3 (inner delta) wiring or / and an external current transformer result in a higher power line current. If the 'Set current' shall include the 'Current factor' to show e.g. real rated motor current the 'Current factor' must be changed before or together with the 'Set current': old) Older versions of the configuration files (GSD, EDS,...) have 1 as default value. Internally interpreted as 100. 1) Internal presentation **100** (default) refers to factor **1.00**. Used for Star and Delta 1 wiring. 2) Used for √3 (inner delta) wiring, refers to factor **1.73** 3) Used for external current transformers without / with √3 (inner delta) wiring. More details see chapter "Planning, Commissioning and Maintenance", sub clauses"Motor Current = Set current versus Wiring" and "External Current Transformer for Higher Currents".	02	4	2	1 1	1 1	during motor off
Set current 1	0.24 - 3200.00 A, step 0.01A	Cur 1	Remark: If the parameter 'Current factor' shall be higher than 100 - referring to 1.00 - it should be sent before ore together with the changed 'Set current'. The UMC22 divides the 'Set current' by the 'Current factor'. When the RUN signal appears and the result is higher than 63 A the RUN signal will be ignored and the internal fault signal will be set (parameter out of range)	01	0	4	0.5A	50	during motor off
Set current 2	see Set current 1	Cur 2	for Pole changing and Dahlander starter only	03	6	4	0.5A	50	d.mot. off

Data Structure on the Internal Interface (continued)

(interface to the FieldBusPlug)

Parameter, Detailed Description (continued)

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Group	Definition / Range	Select.No.	UMC behaviour; description	Param.No.	Adr.Offset	Nr.of Bytes	Default (value)	Default (digital)	after
Overload Protection									
Trip class	Class 5 Class 10 Class 20 Class 30	t r i P 5 10 20 30	Overload calculation (thermal motor image)	04	10	1	10	10	during motor off
Phase loss protection	Off (not activated) On (activated)	0 1	Fault if the actual current of one phase (or two phases) hase less than 50% of the actual current in the other phases. But: The Phase loss protection operates correct only when the actual current of at least one phase is 70% or more of the 'Set current'.	06	12	1	1	1	during motor off
Cooling time	30 - 3600s, step 0,1s	t i .co	Cooling time simulates the cooling behaviour of the inoperating motor after tripping. During cooling time is running RUN is not accepted and WARNING is monitored.	10	16	2	120 s	1200	during motor off
Automatic fault reset	Off On (only for Overload Relay)	0 1	Off: Acknowledge necessary to reset Fault. To switch on 'Cooling time' must be elapsed. On: Only for control function 'Overload relay' due to safety considerations: Automatic reset of Fault when fault condition is off and cooling time has elapsed. Fault is not monitored.	11	18	1	0	0	during motor off
Start-up time	0 - 600s, step 0,1s		Suppresses some signals / trips until motor is in normal running status (Blocking / High current / Low current threshold)	14	21	2	120s	1200	during motor off
Blocking current threshold	0 - 800% * Is, step 5%		Fault signal when current is for >1s above threshold and start-up time has elapsed. (800% means:Blocking protection inactive). Remark: Blocking sets the internal Fault signal and the Monitoring telegram bit "OVERLOAD" and displays trip on the Control Panel) but Cooling time is not started.	23	40	1	800 %	160	during motor off
Low current threshold	30 - 100% * Is, step 5%		Warning when below threshold and start-up time has elapsed	08	14	1	50 %	10	d.mot. off
High current threshold	100 - 800% * Is, step 5%		Warning when above threshold and start-up time has elapsed	09	15	1	150 %	30	d.mot. off

Data Structure on the Internal Interface (continued)

Parameter, Detailed Description (continued)

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

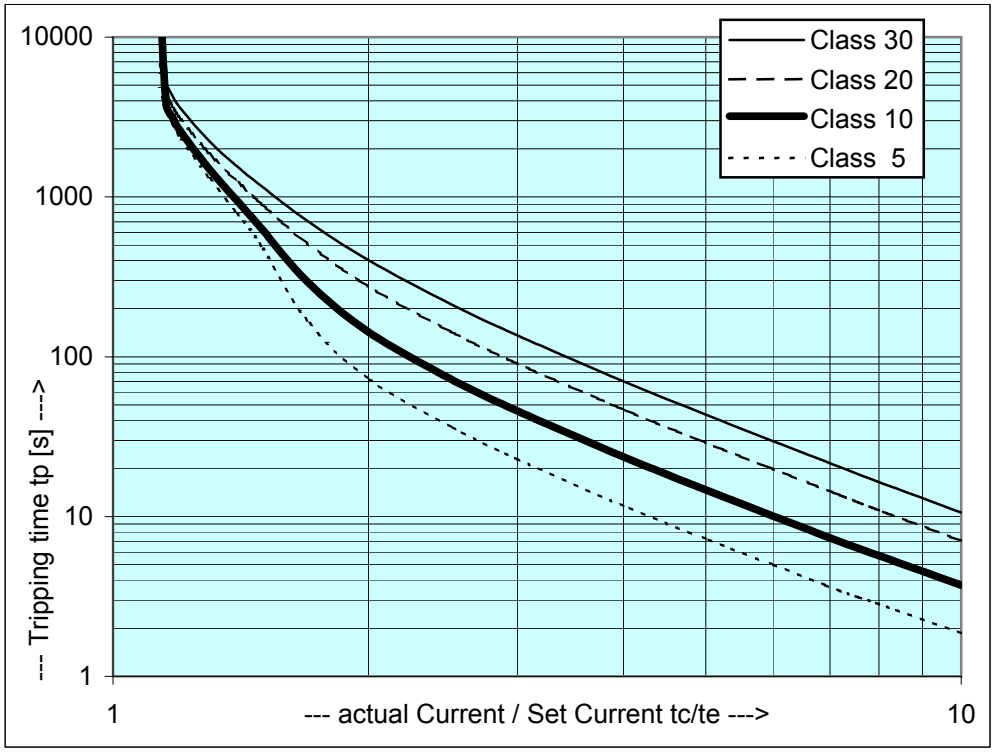
Group	Definition / Range	Select.No.	UMC behaviour; description	Param.No.	Adr.Offset	Nr.of Bytes	Default (value)	Default (digital)	take-over
Communication									
Bus fault reaction	Relays off Relays retain status	bu.Fr 0 1	All cases when UMC does not receive valid telegrams, either when control system or fieldbus or FieldBusPlug is out of order or interrupted	20	37	1	0	0	during motor off
Address check	Off: UMC22 address On: Compare address	0 1	Off: UMC22 address is valid on the fieldbus On: If the UMC22 and the FieldBusPlug contain different addresses the user must decide. Details see chapter "Commissioning","Connection to the Fieldbus, Addressing"	26	36	1	0	0	power up
Service Info									
Operating hours of motor	0 - 65'535, step 1h	oPho	The Control Panel shows the 'opho' in thousends (figure with two decimal places) The control system can only read the value! (if the fieldbus can transmit). Via Control Panel the value can be presetted e.g. to zero.	18	28	2	0	0	-
Number of starts	0 - 1000'000, step 1	n o St	The Control Panel shows the 'nuoS' in thousends. The control system can only read the value! (if the fieldbus can transmit). Via Control Panel the value can be presetted e.g. to zero.	19	32	4	0	0	-
Number of trips	0 - 255, step 1	n o t r	Number of trips. The control system can only read the value! (if the fieldbus can transmit). Via Control Panel the value can be presetted e.g. to zero.	25	30	1	0	0	-
other info, LOCAL only									
Address	see chapters "Control Panel"	A___	see chapters "Control Panel"	-					power up
Bus connection (not a para-meter, only for stand alone)	Off On	bu.c o	Set / reset only via Control Panel. Allows to use the UMC22 without FieldBusPlug, e.g. as Overload relay. Off: Stand alone, without FieldBusPlug On: Connection to FieldBusPlug	-			On		power up
Parameter lock	Off On	PA.Lo	Locks writing the parameters via control system / fieldbus Off: Writing of parameters enabled On: Writing of parameters locked	-			Off		during motor off

Technical Data

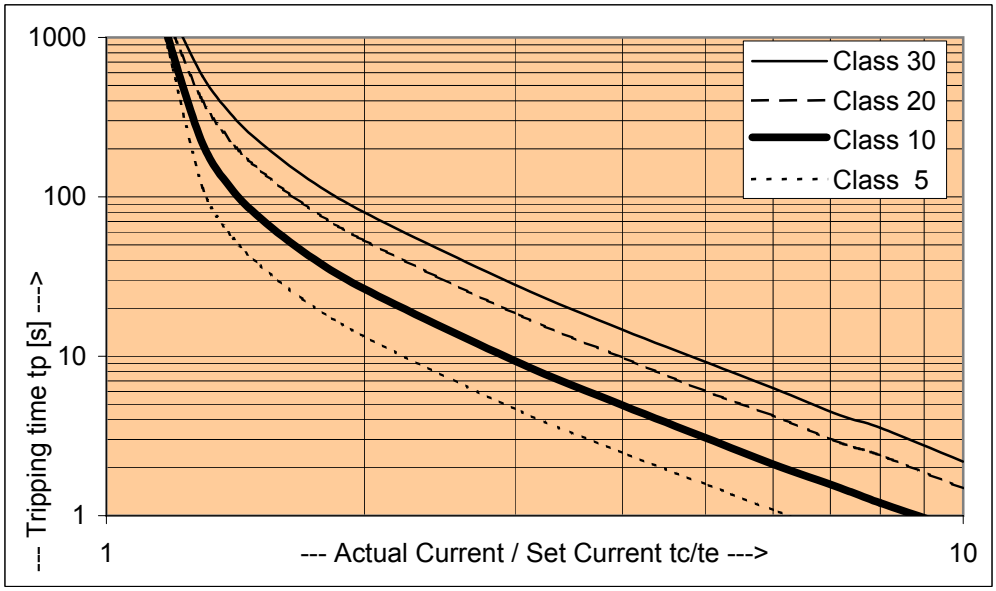
Main Power Lines

Voltage (three-phase systems)	max. 690 V AC
Conductor holes in the current transformers	max. 25 mm² (max. diameter incl. insulation 11 mm)
Set current range for overload protection	0.24 A - 63 A
with provided current transformers (4 types, see chapter"Ordering data)"	50 A - 850 A
Overload protection for three-phase motors	according to EN/IEC 60947-4-1
Trip classes, selectable by parameter	5, 10, 20, 30 (EN/IEC 60947-4-1)

Tripping time **cold** (motor current 0.0A, Ic/Ie = 0% for long time before starting)



Tripping time **warm** (motor current tc/te = 100 % for long time before starting)



Technical Data (continued)

Main Power Lines (continued)

Tolerance of tripping time
including the total ranges of current, temperature 0-55°C, frequency 45-65 Hz

UMC22 alone	+/- 10 %
UMC22 with recommended current transformers	+/- 14 %

Phase loss protection: if the actual current of one phase (or two phases) hase less than 50% of the actual current in the other phases.
Phase loss is detected: (fault is signalled)
The Phase loss protection operates correct only when the actual current of at least one phase is 70% or more of the 'Set current'.

Tripping time for phase loss

Trip Class	5	10	20	30
Tripping time [s] ca.	1,5 s	3 s	6 s	9 s

Cooling simulation: After tripping the internal thermal motor model calculates the reduction of the motor temperature (independend of the parameter 'Cooling time')

Internal cooling time constant	ca. 20 min
If UMC22 is not longer supplied	calculation continues for some minutes (typ. 20 min.)
Parameter 'Cooling time'	an appropriate value need to be set (default = 120 sec)

The 'Cooling time' that need to be set depends on:
- Motor size of the motor: Larger size -> longer cooling time
- After trip motor still rotating (driven) or standstill (without ventilation -> longer cooling time)
- Environment temperature: Higher temperature -> longer cooling time

Regarding this situation the needed cooling time can be assumed. Some examples of motor cooling time-constants (motor standstill) can help to calculate (motors for explosive atmospheres)

Size	1 kW 1-pole	5 kW 1-pole	5 kW 2-pole	20 kW 2-pole	20 kW 3-pole	100 kW 3-pole
t.c.	10 min	15 min	20 min	30 min	40 min	70 min

After three times the cooling time-constant the motor has nearly the environment temperature.

Accuracy class of the monitored current (range 50 to 200 %)

UMC22 alone	3%
UMC22 with provided current transf.	4%
Burden per phase	ca. 30 mΩ
Frequency range	45 - 65 Hz
Frequency converters	not allowed
Short-circuit protection	provided by external SCPD (Short Circuit Protection Device) e.g. MO, MCB, MCCB or Fuse). Refer also to ABB coordination tables (Internet)

Technical Data (continued)

Main Power Lines (continued)

Coordination tables, access via Internet	Preliminary:	www.abb.de/stotz-kontakt Schalt- und Steuerungstechnik English / Deutsch FieldBusPlug Downloads Products, Technical Description...
	Definite:	www.abb.com/lowvoltage (available from June 04 on)
Cross section of lines	according to the rated motor current referring EN/IEC 60947-1 and for particular installation situation referring EN/IEC 60204 or VDE 298-4 resp.	

Control Unit

Supply voltage mode	Internal or external (see chapter "Planning and Commissioning", "Internal Connections")
Supply voltage	24 VDC +30 / -20% (19.2 - 31.2 VDC) including ripple
Supply Current incl. Inputs, relays activated	max. 130 mA (at 18 ... 30 VDC)
Total device dissipation	max. 3.1 W (at 24 VDC)
Reverse polarity protection	yes
Number of digital inputs	6 (DI0 ... DI5)
Number of relay outputs	3 (DO0 ... DO2)
Number of bus interfaces	1 (for connecting an ABB FieldBusPlug)
Number of Control Panel interfaces	1 (to mount Control panel ACS100-PAN)
Internal signal processing of control function and other properties	Selectable by parameters (see Appendizes: Parameters, ...)
Parameter Setting	via Fieldbus, via Control Panel, see Appendices
LEDs on front	1, green: Device ready for operation 1, red: Fault (trip, device fault etc.) 1, yellow: Motor current > 33% of Is
Diagnosis	see 'Appendix: Diagnosis'

Digital inputs

Number of digital inputs	6 (DI0 ... DI5)
Supply for digital inputs (terminal 12)	Internal or external (see chapter 'Internal Connections')
Supply output current for inputs (12)	max. 70 mA
Voltage when standard contacts are used	min.18 V
Isolation	no (see chapter 'Internal Connections')
Input signal bounce suppression	typ. 4ms
Signal 0 range including ripple	-31.2 V ... +5 V
Signal 1 range including ripple	+13 V ... +31.2 V
Input current per channel (24 VDC)	typ. 6.0 mA
Input resistor to 0V	3,9 kOhm
Cable length unshielded	max. 600 m
Cable length shielded	max. 1000 m
Conductor size (solid or stranded)	0.2 - 1.5 mm² / AWG 15 - AWG 24
Tightening torque	0.4 Nm

Technical Data (continued)

Digital Outputs

Number of digital outputs	3 (DO0 ... DO2)	
Type of digital outputs	Relay contacts	
Grouping of contacts	3 contacts with 1 common	
Voltage range of contacts	12 ... 250 V AC	
Lowest switched power for correct signals	1 W or 1 VA	
Switching capacity per relay contact		
240 VAC (AC15 / EN 60947-5-1)	max. 1,5 A	(AC15: electromagnetic load)
120 VAC (AC15 / EN 60947-5-1)	max. 3 A	(AC15: electromagnetic load)
250 VDC (DC13 / EN60947-5-1)	max. 0.11 A	(DC13, electromagnetic load)
125 VDC (DC13 / EN60947-5-1)	max. 0.22 A	(DC13, electromagnetic load)
24 VDC (DC13 / EN60947-5-1)	max. 1 A	(DC13, electromagnetic load)
Total current all contacts (terminal 5 or 6)	max. 4 A	(thermal limit)
Short circuit protection	6 A gL / gG	
Switching of inductive power	Inductive loads need additional measures for spark suppression. Diodes for DC voltage and varistors / RC elements for AC voltage are suitable. Some DC coil contactors contain rectifiers which suppress sparks perfectly.	
Relay contact lifetime, mechanical	500 000 switching cycles	
Lifetime 250 VAC / 0.5 A	100 000 switching cycles	
Lifetime 250 VAC / 1.5 A	50 000 switching cycles	
Lifetime with ABB contactors (250 VAC)	see chapter "Planning, Commissioning and Maintenance", "Connection of contactors"	
Internal Clearance and creepage distances relay contacts to 24 V circuits	> 5.5 mm (safety insulation up to 250 VAC) (EN60947-1, Pollution degree 2)	
Supply power down/up, behaviour: Valid for all motor controlling 'Control functions', but not for 'Transparent' and 'Overload Relay'.	Whenever the supply voltage of the UMC22 is switched off and on the start of the motor needs a new 0 to 1 transition of the Run signal.	

FieldBusPlug connection

Mounting	Plug connection, fastening with supplied screw
Tightening torque of the fixing screw	0,8 Nm + rotation 90 degree
Suitable ABB FieldBusPlug Types	Order No.
PDP22 (PROFIBUS-DP)	1SAJ240000R0003 / R0005 / R0010 / R0050 Cable length: 0.25m / 0.5m / 1m / 5m resp.
DNP22 (DeviceNet Plug)	1SAJ230000R0003 / R0005 / R0010 / R0050
CANopen, Ethernet, others (planned)	planned

Technical Data (continued)

Environment and Mechanical Datas

Mounting	on DIN rail (EN 50022-35) or with 4 screws M4 (refer to chapter 'Dimensions')
Mounting position	no restrictions
Dimensions W*H*D	70*105*110 mm (incl. FieldBusPlug and Control Panel)
Net. weight (Current Transf.+ Control Unit)	0.39 kg
Terminals: Conductor cross section	max. 2.5 mm² or max. 2 x 1.5 mm²
Current Transformer bushing holes	11 mm Ø (25 mm²)
Degree of protection	IP 20
Storage temperature range	-25 ... +70 °C
Operation temperature range	0 ... +55 °C
Approvals	CE
Approvals (being processed)	UL, CSA, GL, BV, LRS, ATEX

Ordering data

	Order Nr.
Universal Motor Controller UMC22-FBP	1SAJ 5100 00 R0100
Control Panel ACS100-PAN	1SAJ 5100 01 R0001 (not in scope of delivery, to order separately)
Control P. Extension Cable ACS100-CAB	1SAJ 5100 02 R0001 (not in scope of delivery, to order separately)
FieldBusPlug Types	
PDP22 (PROFIBUS-DP)	1SAJ240000R0003 / R0005 / R0010 / R0050 Cable length: 0.25m / 0.5m / 1m / 5m resp.
DNP22 (DeviceNet Plug)	1SAJ230000R0003 / R0005 / R0010 / R0050
CANopen, Ethernet, others (planned)	planned

External current transformers

	Type (recommended current range)	
a	KORC 4L185 R/4 (63 - 185 A)	1SCA 0221 93 R7830
b	KORC 4L310 R/4 (185 - 310 A)	1SCA 0221 81 R0760
c	KORC 5L500 R/4 (310 - 500 A)	1SCA 0222 08 R1010
d	KORC 5L850 R/4 (500 - 850 A)	1SCA 0222 08 R1440

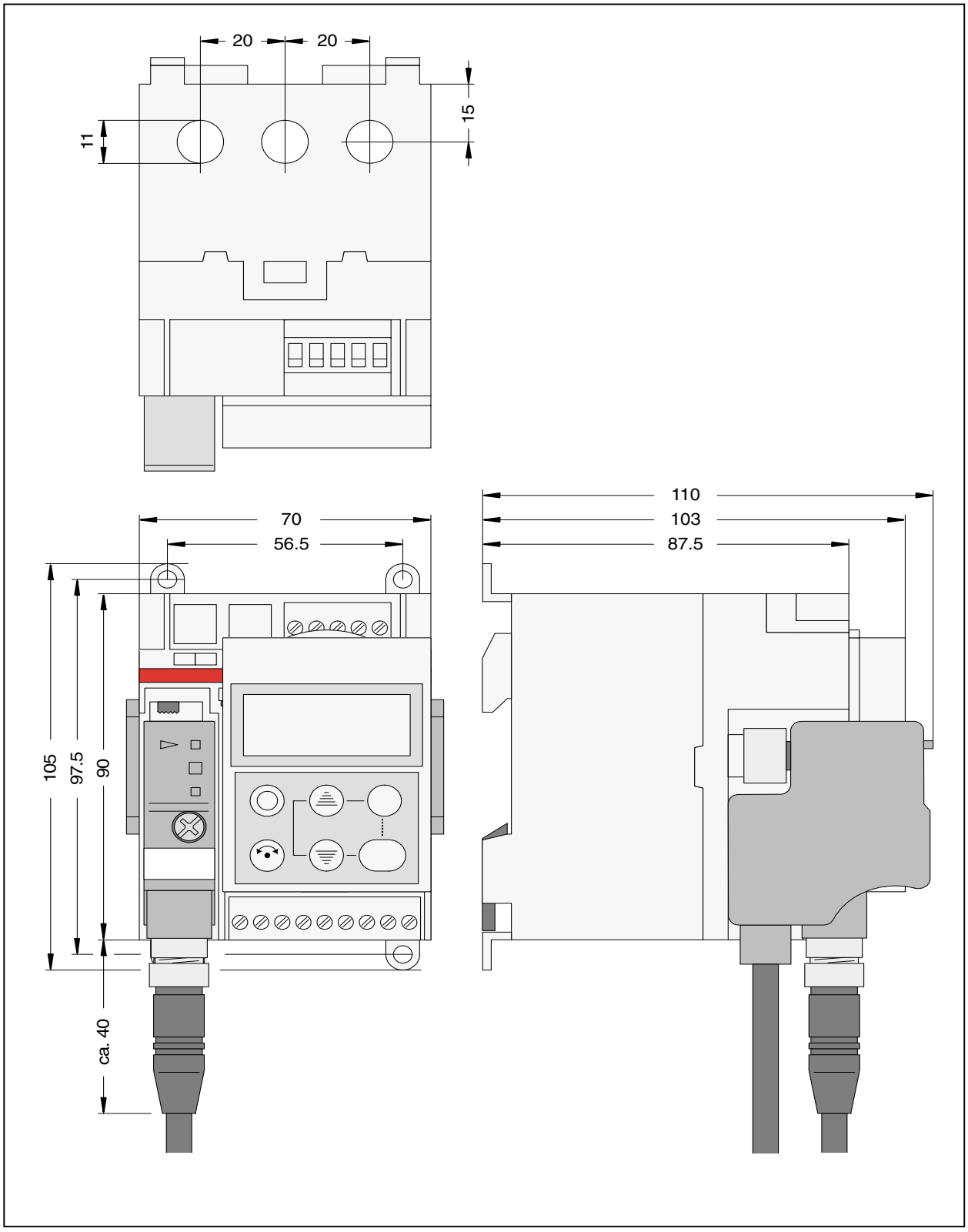
Link kit (bar)

	Type (for contactor type)	
a	DT450/A185 (AF145 - AF185)	1SAZ 5019 01 R1001
b	DT450/A300 (AF260 - AF300)	1SAZ 5019 02 R1001
c	DT500/AL460S (AF400, AF460)*	1SAZ 7019 02 R1011
d	DT500/AL750S (AF580, AF750)*	1SAZ 8019 02 R1011

(*Link kits for Star-Delta-Starter. Others s.catalogue)

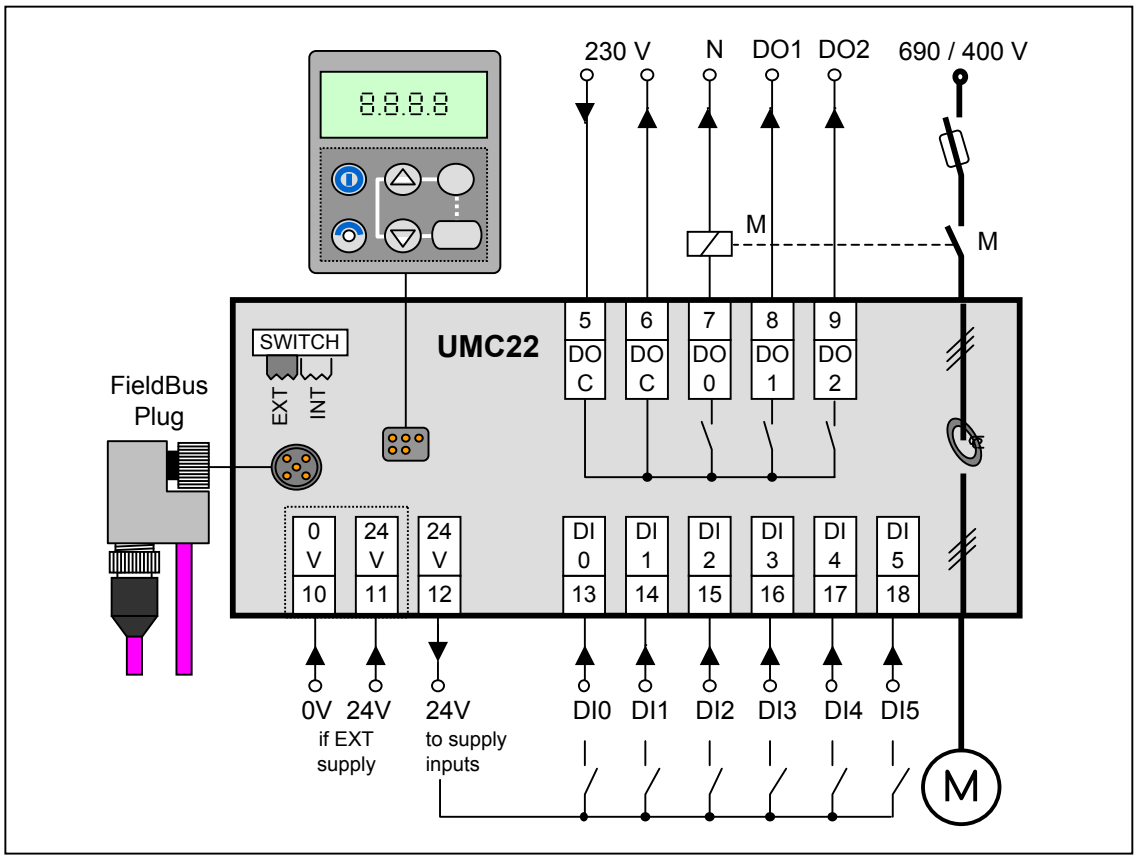
Technical Data (continued)

Dimensions



Appendix A: Control Functions

Circuit Arrangement, Description, Data and Parameters, Time Diagrams



Page

Transparent

The UMC22 parametrized with the 'Control function' = 'Transparent' (default) behaves like an I/O-module with an integrated overload check. The outputs DO0 ... DO2 and the inputs DI0 ... DI5 are directly connected to the fieldbus and are independent of the overload status.

The only possible exceptions:
DO2 outputs the internal fault signal if the parameter 'Fault output signal' is set to 'On'. Default is 'Off', in this case the output is controlled directly via the fieldbus.
If the parameter 'Fault input' = 'On' : A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.

All kinds of faults set the internal fault bit. Following the monitoring signal FAULT is sent to the fieldbus, the red LED lights on and the FAULT signal on the Control Panel flashes.

If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally . The 'Cooling time' is a parameter and can be adjusted.
More detailed information are monitored in the diagnosis telegram and on the Control Panel.

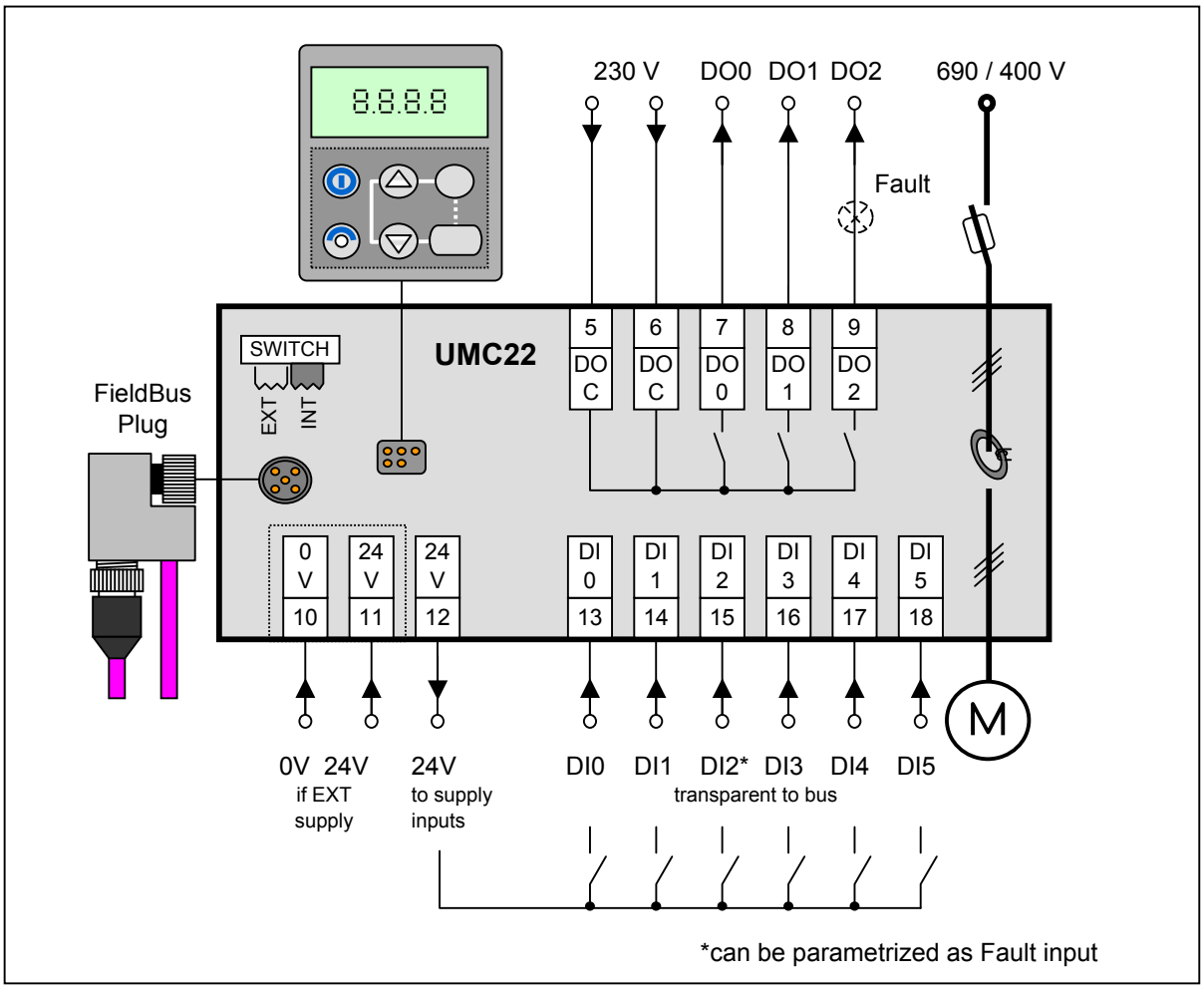
All faults must be acknowledged via fieldbus or via Control Panel.

The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing Set. Details see chapter "Planning and Commissioning".

Basis circuit diagram

Parameters to be changed (based on default)

- ► Control function: Transparent mode is default
- ► Address if connected to bus
- ► Set current 1 and overload parameters if function is used



Transparent (continued)

Important:
Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily - the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).
Details see chapter "Planning and commissioning", "Wiring and Internal 24V / 0V Connections".

Interface and data overview

Hardware Inputs / Outputs

Terminal	13	14	15	16	17	18
Device Input	**DI0** to bus	**DI1** to bus	**DI2** to bus	**DI3** to bus	**DI4** to bus	**DI5** to bus
Terminal	7	8	9			
Device Outputs	**DO0** from bus	**DO1** from bus	**DO2*** from bus			

* depending on parameter 'Fault output'

Fieldbus telegram: Monitoring signals / Commands

Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	-	-	-	-	-	-
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	-	-	**SELF TEST**	-	-	-
Command Byte 1	**DO2*** (UMC output)	**DO1** (UMC output)	**DO0** (UMC output)	-	-	-	-	-

Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	-	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked***	**Commu-nication fault**	**Parameter out of range**	-	-	-	-
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	**-**	**Self test running**	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Details see chapter "Data Overview" *depending on parametrisation

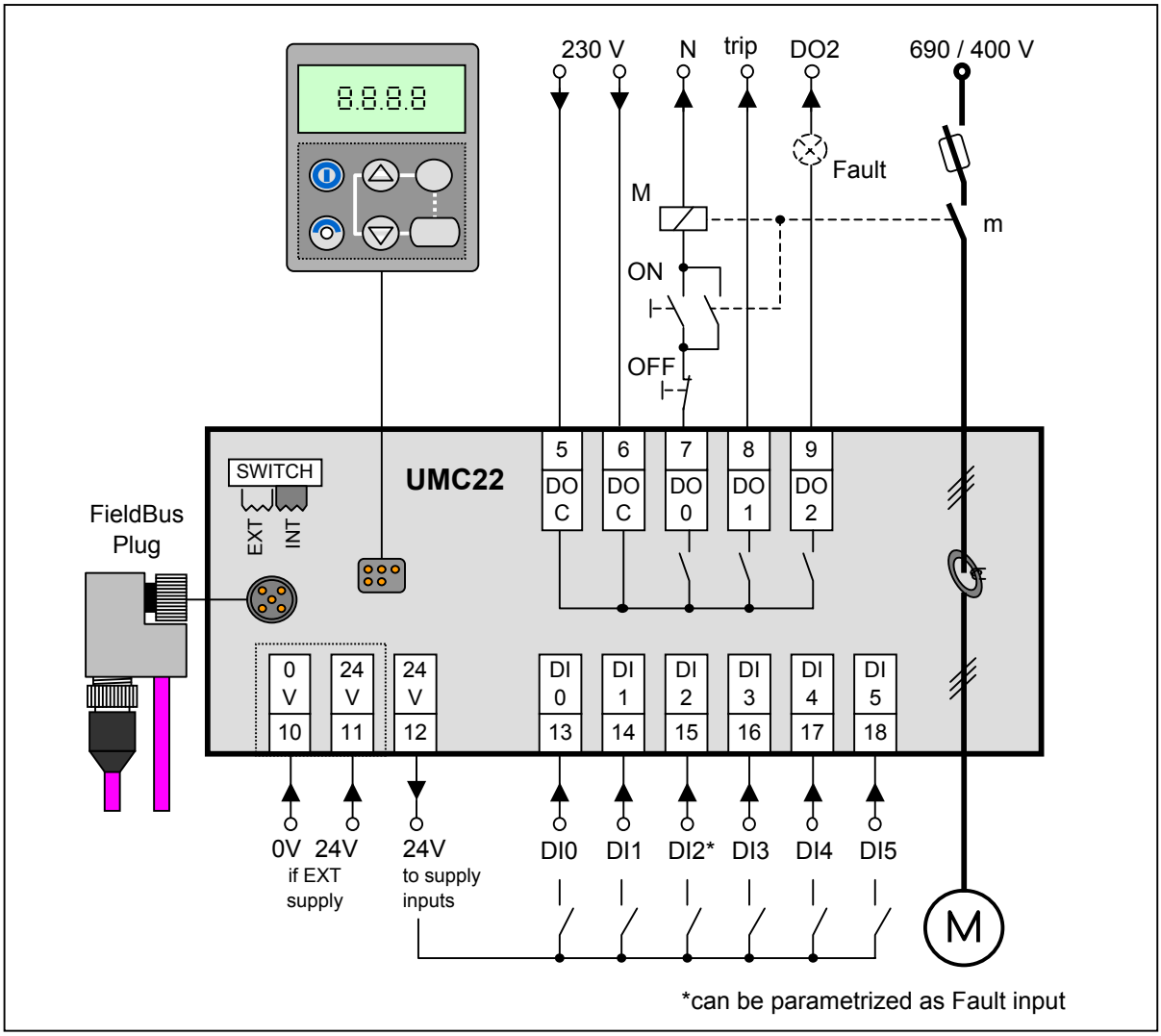
Overload Relay

The UMC22 parametrized with the 'Control function' = 'Overload relay' provides excellent protection of a motor. Dedicated to replace a standard overload relay, stand-alone operation can be selected via Control Panel setting the parameter 'Bus connection' = 'Off'.

Basis circuit diagram

Main features
► Motor contactor at output DO0

Parameters to be changed (based on default)
► Control function: Overload relay
► Set current 1, overload parameters
► 'Bus communication' = 'Off' if used without Fieldbus to be selected by Control Panel, 'bu.co' = 0
► Address if used, via Control Panel or Addressing Set



Overload Relay (continued)

Description

After parametrizing 'Control function' = 'Overload Relay' and 'Bus communication' = 'Off' power on is necessary to start the operation. Immediately contact DO0 closes, contact DO1 opens. If 'Bus communication' = 'On' the active connection to the control system is an additional condition to start the operation.

Attached control functions

With 'Fault output' = 'On' also the output contact DO2 operates similar to DO1.
If 'Fault output' = 'Off' output contact DO2 can be controlled via fieldbus.
'Fault input' = 'On': A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.

Fault behaviour

All kinds of detected external and internal faults set the internal fault bit. Following contact DO0 opens, DO1 (and DO2 if parametrized) closes,
the monitoring signal FAULT is sent to the fieldbus, the red LED lights on and the FAULT signal on
If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally . The 'Cooling time' is a parameter and can be adjusted.
All faults must be acknowledged via fieldbus or via Control Panel.
Exception: If the parameter 'Automatic fault reset' = 'On' the contacts DO0 closes and DO1 (and DO2) opens immediately when the cooling time is over (only available with 'Overload Relay').

Addressing

The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing Set. Details see chapter "Planning and Commissioning".

Important:
Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily - the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).
Details see chapter "Planning and commissioning", "Wiring and Internal 24V / 0V Connections".

Overload Relay (continued)

Interface overview

Hardware Inputs / Outputs

Terminal	13	14	15	16	17	18
Device Input	**DI0** to bus	**DI1** to bus	**DI2** to bus	**DI3** to bus	**DI4** to bus	**DI5** to bus
Terminal	7	8	9			
Device Outputs	**trip**	**trip inverted**	**DO2*** (from bus)			

* depending on parameter 'Fault output'

Fieldbus telegram: Monitoring signals / Commands

Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	-	-	-	-	-	-
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	-	-	**SELF TEST**	-	-	-
Command Byte 1	**DO2*** (UMC output)	**-**	**-**	-	-	-	-	-

** actually only if 'Overload behaviour' = 0

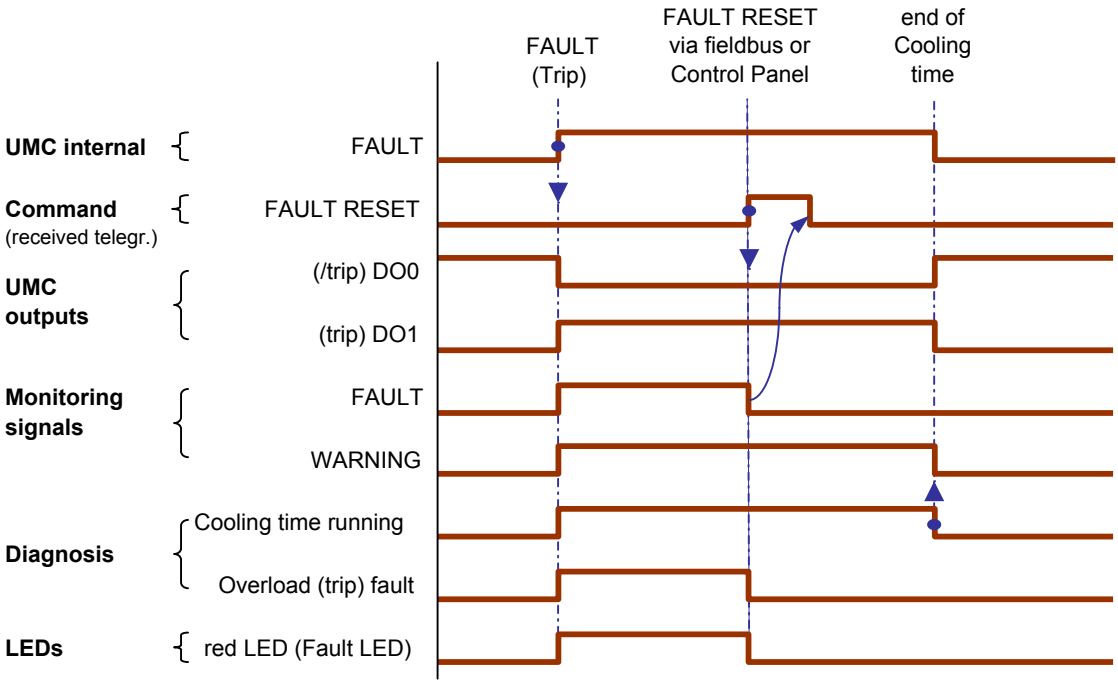
Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	**-**	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked***	**Commu-nication fault**	**Parameter out of range**	-	-	-	-
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	**-**	**Self test running**	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Details see chapter "Data Overview"

Overload Relay (continued)

Time diagram: Overload



Direct Starter

The UMC22 parametrized with the 'Control function' = 'Direct Starter' provides excellent protection and control of a motor for one direction of rotation. The connection to a fieldbus is made via the appropriate type of the FieldBusPlug.

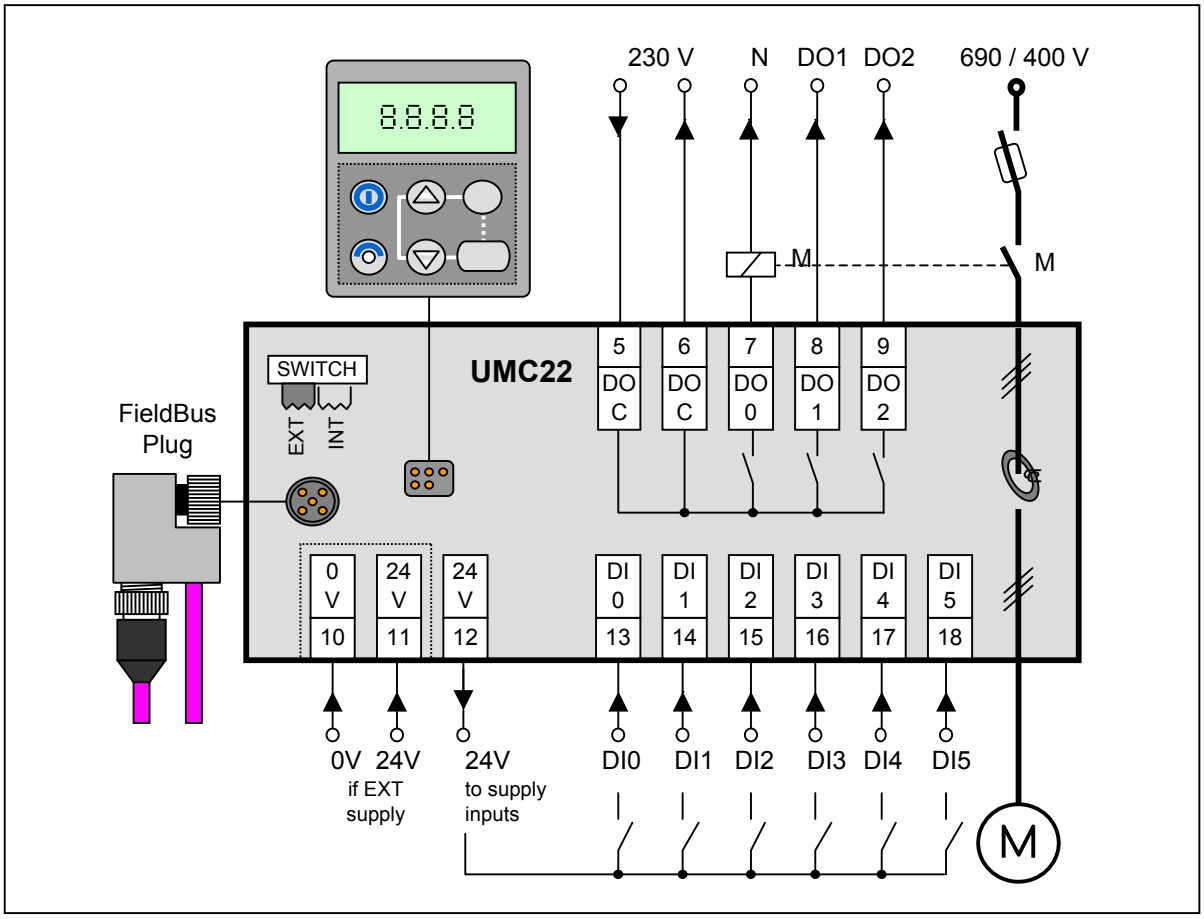
Basis circuit diagram

Main features

- ► motor contactor at DO0
- ► check-back by current

Parameters to be changed (based on default)

- ► Control function = Direct Starter
- ► Set current 1, overload parameters
- ► Address via Control Panel or Addressing Set



Important:
Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily - the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).
Details see chapter "Planning and commissioning", "Wiring and Internal 24V / 0V Connections".

Direct starter (continued)

Description

The UMC22 parametrized with the 'Control function' = 'Direct Starter' provides excellent protection and control of a motor for one direction of rotation. The connection to a fieldbus is made via the appropriate type of the FieldBusPlug.
With 'Direct Starter' the output DO0 is defined to drive the motor contactor coil.

Attached control function

The parameter set 'Attached control functions' prepare the 'Direct Starter' to support different circuit arrangements including the use of inputs and outputs for particular use.
Examples:
'Fault output' = 'On': The output contact DO2 closes if a fault appears.
'Fault input' = 'On': A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.
Remark: Only remaining outputs can be controlled but all inputs are monitored via fieldbus.

Other parameters define the protection behaviour and additional functions. Refer also chapter "Parameters...."

Starting

After setting the parameter 'Direct Starter' power on is necessary to activate and to allow to start the motor with the bus command RUN FORWARD or via local control.
All other parameters are activated with motor on.

Check-back

When the motor is started the 'Check-back' status is expected within 300 ms, otherwise a fault is detected. Selectable by parameter, motor current or auxiliary contact signal can serve as check-back status.
Notice: 'Check-back'='Simulation' is recommended only to be set via Control Panel during commissioning. The control system is only allowed to set 'Auxiliary contacts' or 'Motor current' to guarantee that the check-back operates correctly after next power on.

Fault behaviour

All kinds of detected external and internal faults set the internal fault bit. Following contact DO0 for the contactor coil opens, the monitoring signal FAULT is sent to the fieldbus, the red LED lights on and the FAULT signal on the Control Panel display flashes.
All kinds of detected external and internal faults set the internal fault bit. In the following:
► contact DO0 for the contactor coil opens,
► the monitoring signal FAULT is sent to the fieldbus,
► the red LED lights on and
► the FAULT signal on the Control Panel display flashes.
If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally . The 'Cooling time' is a parameter and can be adjusted.
More detailed information are monitored in the diagnosis telegram and on the Control Panel.

All faults must be acknowledged via fieldbus or via Control Panel.
Additional the cooling time must be elapsed to allow to restart the motor.

Addressing

The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing Set. Details see chapter "Planning and Commissioning".

Direct Starter (continued)

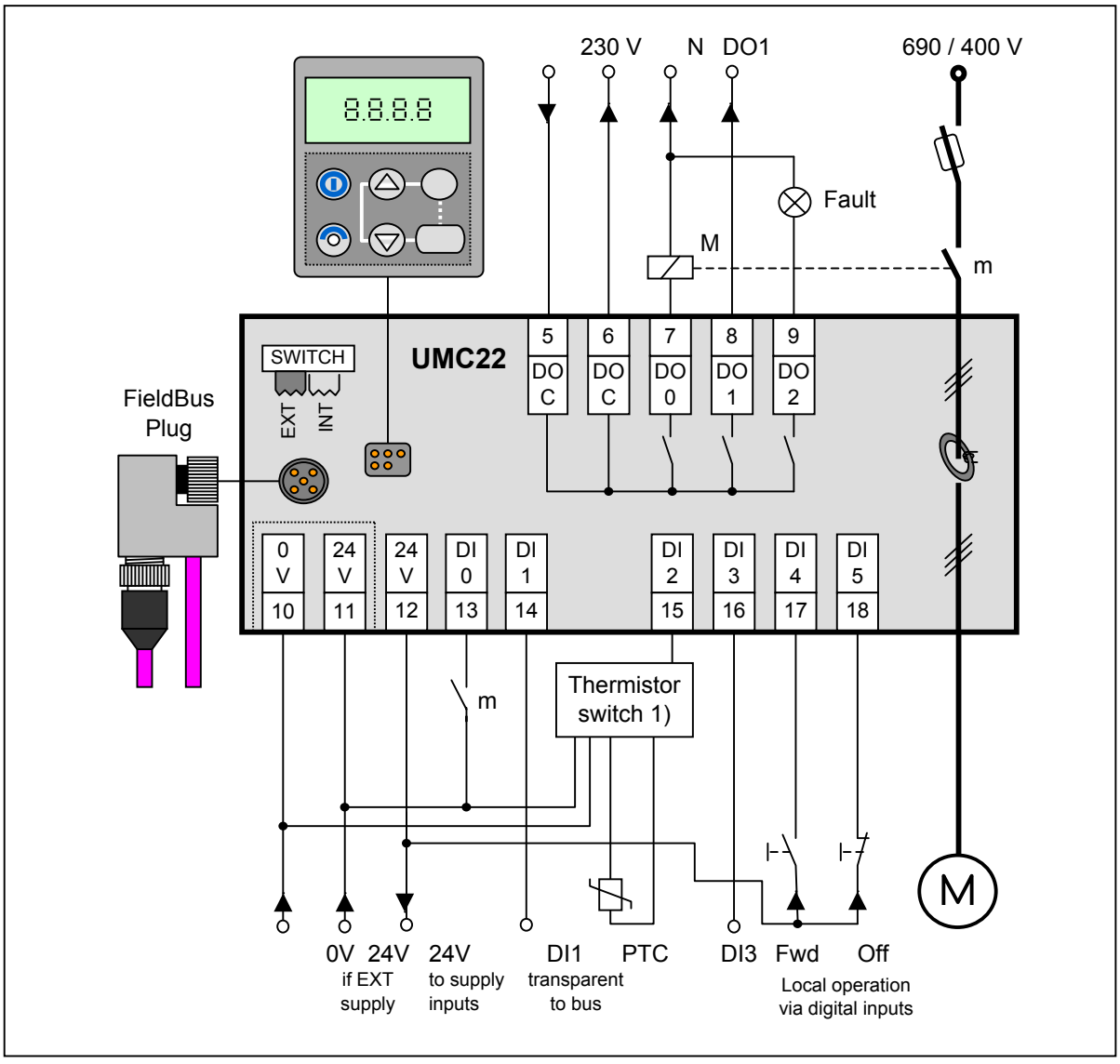
Direct Starter with all possible extentions

Main features

- ► Motor contactor at output DO0
- ► Fault lamp at output DO2
- ► Check-back by aux.contacts at inp.DI0
- ► Fault input (closed circuit) at DI2
- ► Local operation via inputs DI4 and DI5

Parameters to be changed (based on default)

- ► Control function = direct starter
- ► Fault output signal = On
- ► Check-back = auxiliary contact
- ► Fault input = On
- ► Local operation via digital inputs = On
- ► Set current 1, overload parameters
- ► Address via Control Panel or Addressing Set



Remark:
1) Fault Input: Closed circuit signal: 1 = no fault
2) "Fwd": Momentary-contact switch
3) "Off": Closed circuit signal: 0 = dominating Off

Direct Starter (continued)

Interface overview

Hardware Inputs / Outputs

Terminal	13	14	15	16	17	18
Device Input	**DI0** to bus	**DI1** to bus	**DI2** to bus	**DI3** to bus	**DI4*** (loc.:Run)	**DI5*** (local:Off)
Terminal	7	8	9			
Device Outputs	**DO0** (Forward)	**DO1** (from bus)	**DO2*** (Fault out)			

* depending on parametrization

Fieldbus telegram: Monitoring signals / Commands

Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	**LOCAL CONTROL**	-	-	**RUN FORWARD**	**OFF**	-
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	**AUTO MODE**	-	**SELF TEST**	**RUN FORWARD**	**OFF**	-
Command Byte 1	**DO2*** (UMC output)	**DO1*** (UMC output)	**-**	-	-	-	-	-

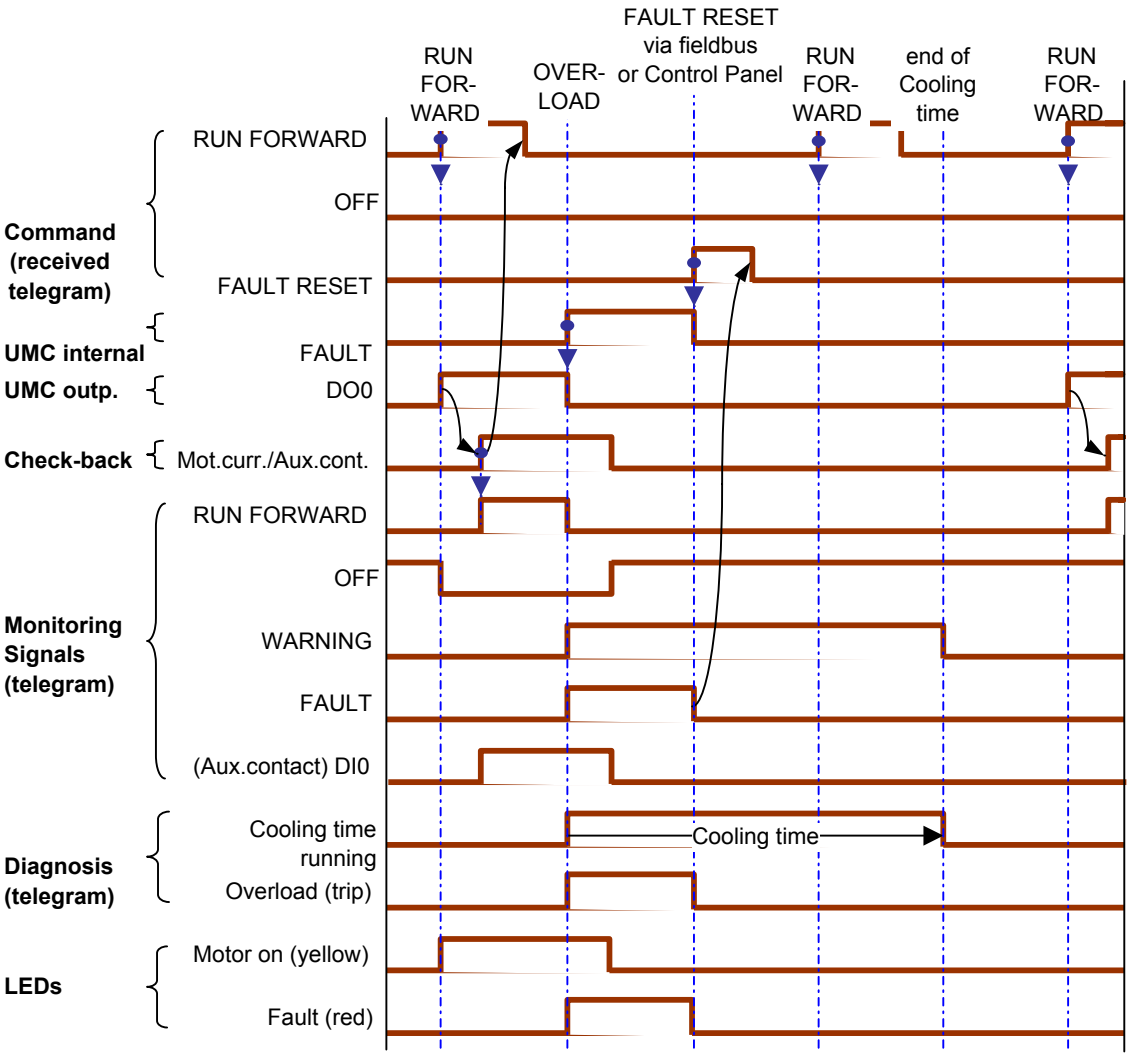
Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	-	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip)**	**Motor blocked**	**Communi-cation fault**	**Parameter out of range**	**Current check-back fault***	-	-	**Relay 0 check-back fault***
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	**-**	**Self test running**	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Details see chapter "Data Overview"

Direct Starter (continued)

Timing Diagram: Overload



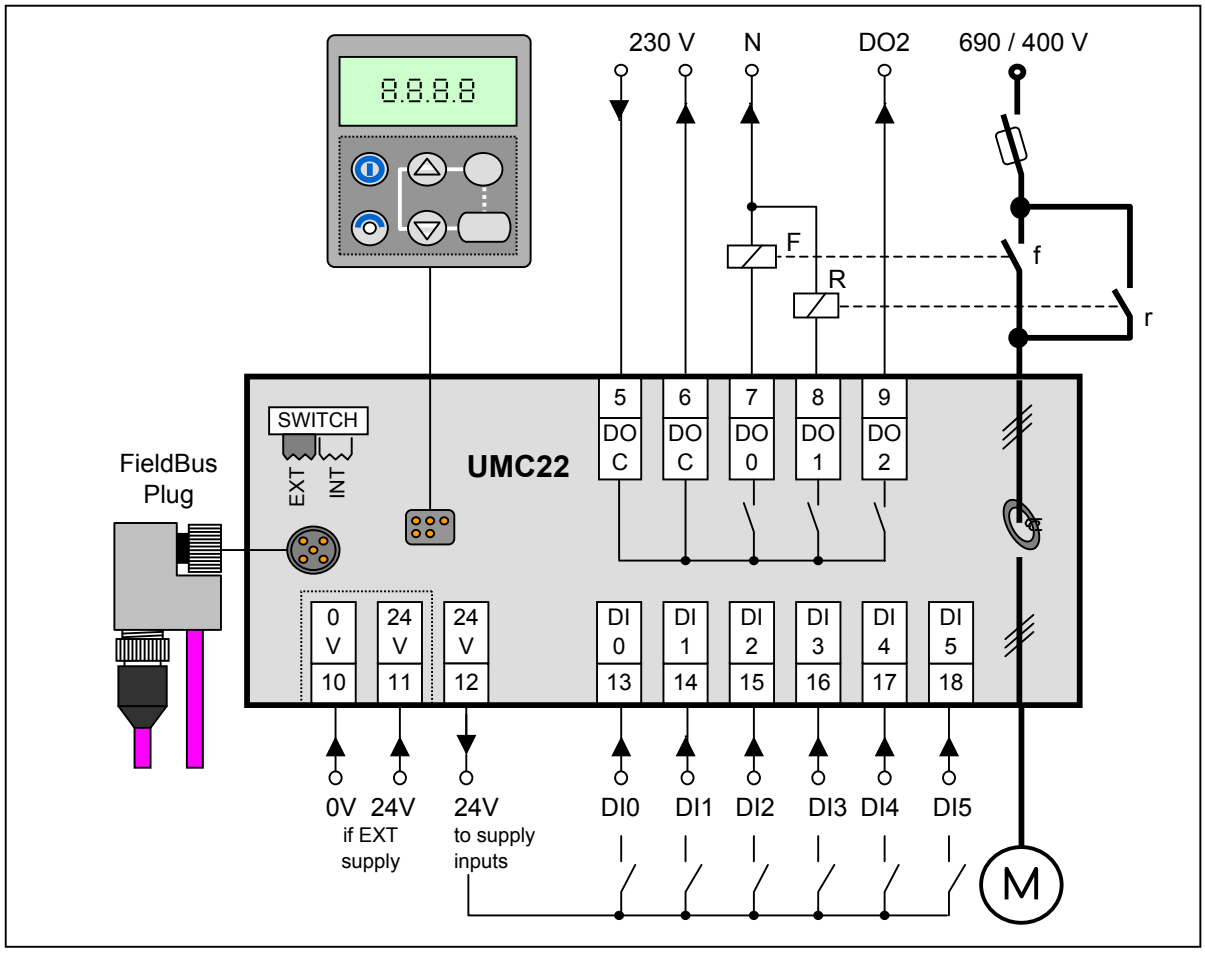
Reversing starter

The UMC22 parametrized with the 'Control function' = 'Reversing Starter' provides excellent protection and control of a motor for two directions of rotation. The connection to a fieldbus is made via the appropriate type of the FieldBusPlug.

Basic circuit

Main features
- ► Contactor (forward) at output DO0
- ► Contactor (reverse) at output DO1
- ► Check-back by current

Parameters to be changed (based on default)
- ► Control function = reversing starter
- ► Set current 1, overload parameters
- ► Address via Control Panel or Addressing Set



Important:
Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily - the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).
Details see chapter "Planning and commissioning", "Wiring and Internal 24V / 0V Connections".

Reversing starter (continued)

Description

The UMC22 parametrized with the 'Control function' = 'Reversing Starter' provides excellent protection and control of a motor for two directions of rotation. The connection to a fieldbus is made via the appropriate type of the FieldBusPlug.

With 'Reversing Starter' the outputs DO0 (forward) and DO1 (reverse) are defined to drive the motor contactor coils.

Attached control function
The parameter set 'Attached control functions' prepare the 'Direct Starter' to support different circuit arrangements including the use of inputs and outputs for particular use.
Examples:
'Fault output' = 'On': The output contact DO2 closes if a fault appears.
'Fault input' = 'On': A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.
Remark: Via Fieldbus only remaining outputs can be controlled but all inputs are monitored.

To define the protection behaviour and other functions additional parameters are available. Refer also chapter "Parameters...."

Starting
After setting the parameter 'Reverse Starter' power on is necessary to activate and to allow to start the motor with the bus command RUN FORWARD / RUN REVERSE or via local control.
All other parameters are activated with motor on.

Change direction
Change from one direction to the other requests:
- An OFF command is necessary before switching to the opposite direction.
- The OFF command starts the 'Reversing lock out time' (parametrizable).
- The opposite RUN command - 0-1 transition - is accepted only when the 'Reversing lock out time' has elapsed.

Check-back
When the motor is started the 'Check-back' status is expected within 300 ms, otherwise a fault is detected. Selectable by parameter, motor current or auxiliary contact signal can serve as check-back status.
Notice: 'Check-back'='Simulation' is recommended only to be set via Control Panel during commissioning. The control system must only set 'Auxiliary contacts' or 'Motor current' to guarantee that the check-back operates correctly after next power on.

Fault behaviour
All kinds of detected external and internal faults set the internal fault bit. In the following:
► contact DO0 (or DO1 resp.) for the contactor coil opens,
► the monitoring signal FAULT is sent to the fieldbus,
► the red LED lights on and
► the FAULT signal on the Control Panel display flashes.
If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally . The 'Cooling time' is a parameter and can be adjusted.
All faults (except Communication fault) must be acknowledged via fieldbus or via Control Panel to start the motor.
Additional the 'Cooling time' must have elapsed to allow to restart the motor with a 0-1 transition of the RUN FORWARD or RUN REVERSE command.
More detailed information are monitored in the diagnosis telegram and on the Control Panel.

Addressing
The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing Set. Details see chapter "Planning and Commissioning".

Reversing starter (continued)

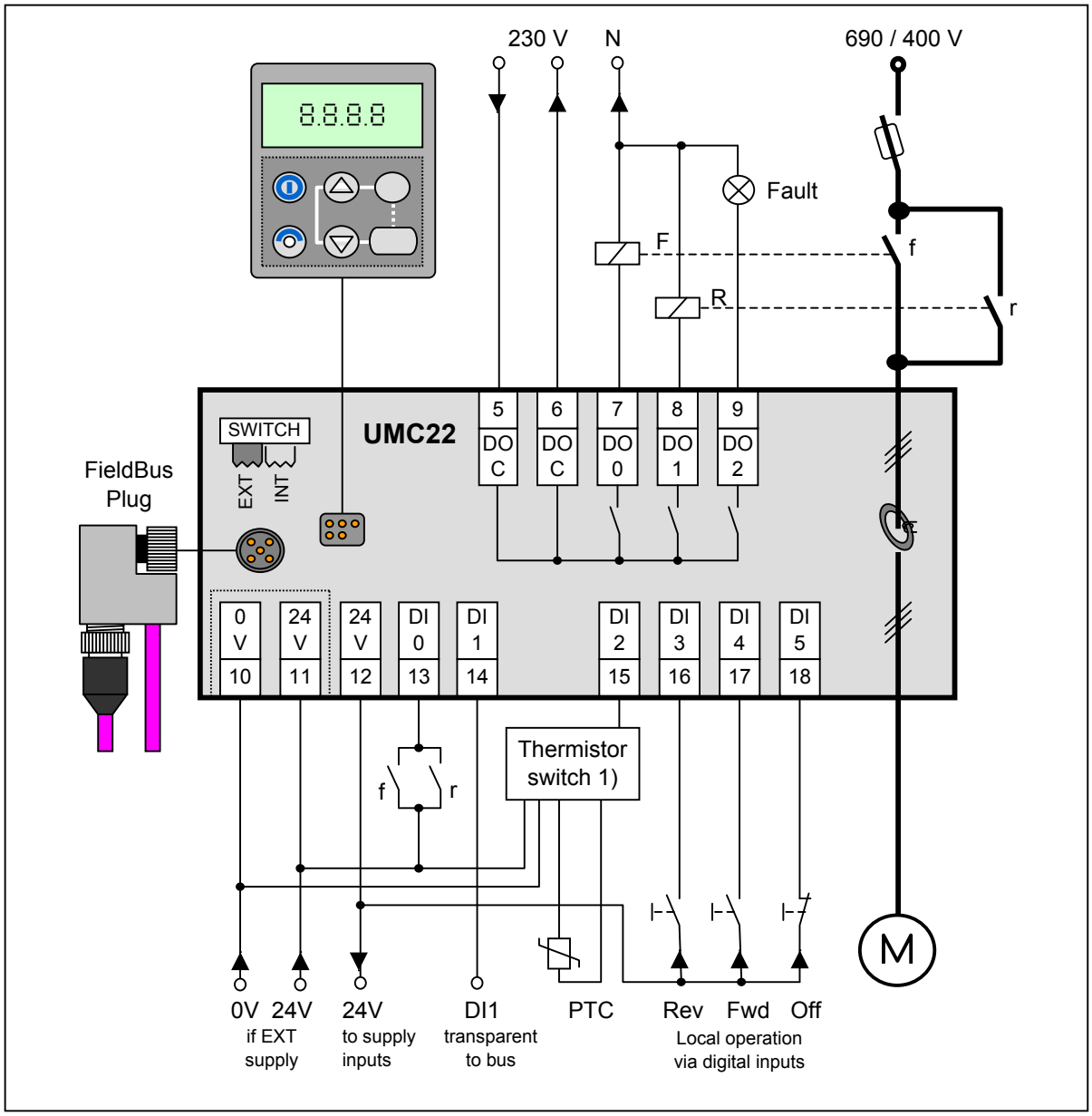
Reversing Starter with all possible extentions

Main features

- ► Contactor (forward) at outputs DO0
- ► Contactor (reverse) at outputs DO1
- ► Fault lamp at output DO2
- ► Check-back by aux.cont.at input DI0
- ► Fault input (closed circuit) at DI2
- ► Local operation via inputs DI3, 4, 5

Parameters to be changed (based on default)

- ► Control function = reversing starter
- ► Set current 1, Set current 2, overload parameters
- ► Fault output = on
- ► Check-back = auxiliary contact
- ► Fault Input = on
- ► Local operation via digital inputs = on
- ► Address via Control Panel or Addressing Set



Remark: 1) Fault Input: Closed circuit signal: 1 = no fault
2) "Fwd", "Rev": Momentary-contact switch
3) "Off": Closed circuit signal: 0 = dominating Off

Reversing starter (continued)

Interface overview

Hardware Inputs / Outputs

Terminal	13	14	15	16	17	18
Device Input	**DI0*** (aux.cont)	**DI1** (to bus)	**DI2*** (ext.fault)	**DI3*** (loc.Rev)	**DI4*** (loc.:Fwd)	**DI5*** (local:Off)
Terminal	7	8	9			
Device Outputs	**DO0** (Forward)	**DO1** (Reverse)	**DO2*** (Fault out)			

* depending on parametrization

Fieldbus telegram: Monitoring signals / Commands

Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	**LOCAL CONTROL**	**REVERSING LOCK-OUT TIME**	-	**RUN FORWARD**	**OFF**	**RUN REVERSE**
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	**AUTO MODE**	-	**SELF TEST**	**RUN FORWARD**	**OFF**	**RUN REVERSE**
Command Byte 1	**DO2*** (UMC output)	**-**	**-**	-	-	-	-	-

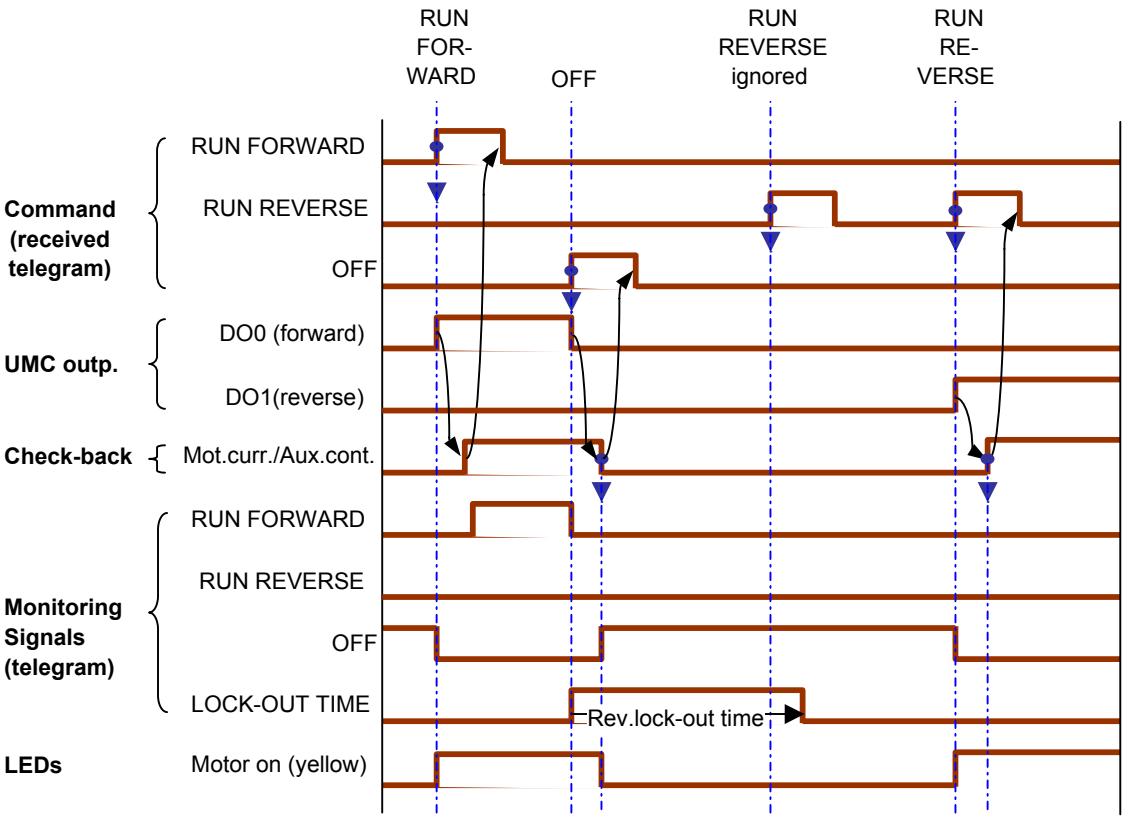
Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	-	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked**	**Communi-cation fault**	**Parameter out of range**	**Current check-back fault***	-	-	**Relay 0 check-back fault***
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	**Reversing Lock-out time**	**Self test running**	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Details see chapter "Data Overview"

Reversing starter (continued)

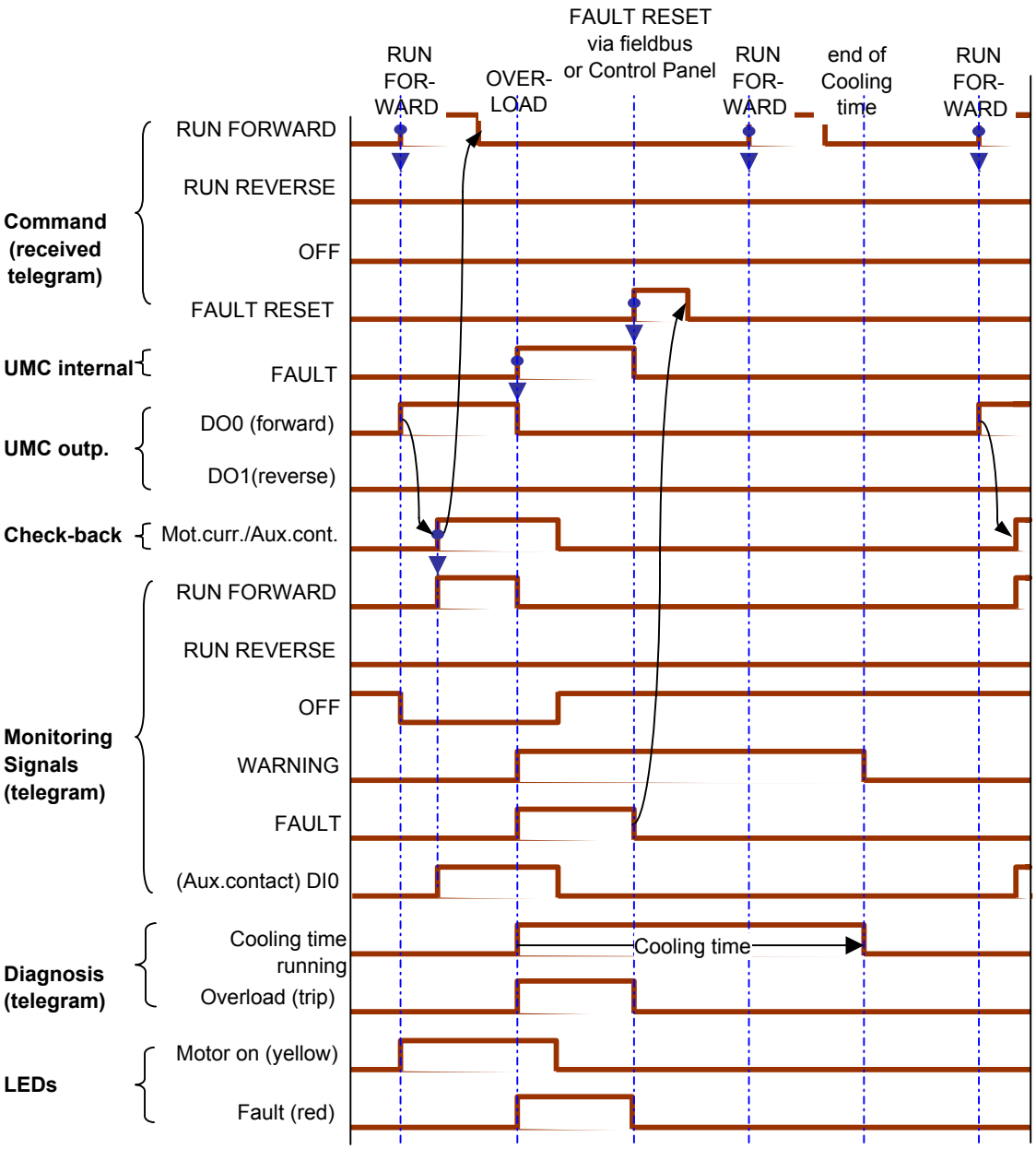
Timing Diagram 1: Change Direction



Remark:
- Opposite direction only possible after 'OFF'.
- Restart in the same direction without regard of the 'Reversing lock-out time'.

Reversing starter (continued)

Timing Diagram 2: Overload



Restart possible only if 'Cooling time' has elapsed and fault is acknowledged.

Star-Delta-Starter 1

The UMC22 parametrized with the 'Control function' = 'Star-Delta-Starter' provides excellent protection and control of a motor for one direction of rotation including the time or current conrolled star-delta transition. The connection to a fieldbus is made via the appropriate type of the

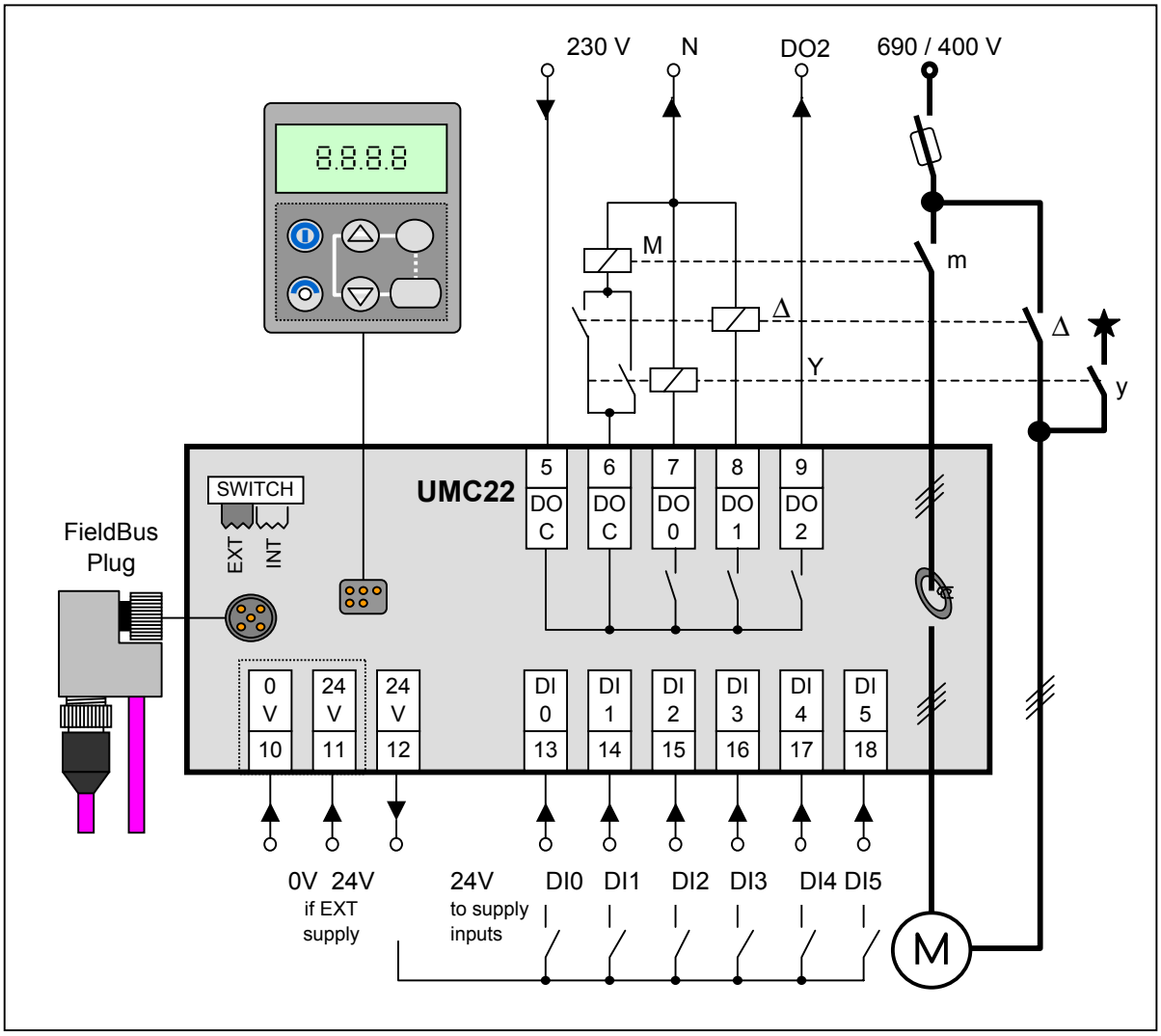
Basic circuit

Main features

- ► Motor contactor (star) at output DO0
- ► Motor contactor (delta) at output DO1
- ► Motor contactor (main) via auxiliary contacts of the star and delta contactor
- ► Check-back by current

Parameters to be changed (based on default)

- ► Control function = Star-Delta-Starter
- ► Address, Set current and Overload protection



Remark: For this case of motor wiring the 'Set current' has to be set to 58% of the nominal motor

Star-Delta-Starter 1 (continued)

Description

With 'Star-Delta-Starter' the outputs DO0 and DO1 are defined to drive the motor contactor coils. The main contactor is controlled via auxiliary contacts of the star and delta contactors. Once the motor is started with RUN FORWARD the star-delta-sequence is controlled automatically by the

Attached control function

The parameter set 'Attached control functions' prepare the 'Star-Delta-Starter' to support different circuit arrangements including the use of inputs and outputs for particular use.
Examples:
Star-Delta change over:
Default of the parameter 'Star-delta change-over mode' is 'Current': The UMC22 switches from star to delta when the current decreases under 90% of the 'Set current'. Additional the parametrizable 'Star-delta starting time' (default 60 s) is started. If this time has elapsed the UMC22 must be in Delta mode otherwise Current check-back fault is signalled and the motor is stopped.
'Fault output' = 'On': The output contact DO2 closes if a fault appears.
'Fault input' = 'On': A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.
Remark: Only remaining outputs can be controlled but all inputs are monitored via fieldbus.

Other parameters define the protection behaviour and additional functions. Refer also chapter "Parameters...."

Starting

After setting the parameter 'Star-Delta-Starter' power on is necessary to activate and to allow to start the motor with the bus command RUN FORWARD or via local control.
All other parameters are activated with motor on.

Check-back

When the motor is started the 'Check-back' status is expected within 300 ms, otherwise a fault is detected. Selectable by parameter, motor current or auxiliary contact signal can serve as check-back status.
Notice: 'Check-back'='Simulation' is recommended only to be set via Control Panel during commissioning. The control system must only set 'Auxiliary contacts' or 'Motor current' to guarantee that the check-back operates correctly after next power on.

Fault behaviour

All kinds of detected external and internal faults set the internal fault bit. In the following:
► contact DO0 (or DO1 resp.) for the contactor coil opens,
► the monitoring signal FAULT is sent to the fieldbus,
► the red LED lights on and
► the FAULT signal on the Control Panel display flashes.
If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally. The 'Cooling time' is a parameter and can be adjusted.
More detailed information are monitored in the diagnosis telegram and on the Control Panel.

All faults must be acknowledged via fieldbus or via Control Panel.
Additional the 'Cooling time' must be elapsed to allow to restart the motor with a 0-1 transition of the RUN FORWARD command.

Addressing

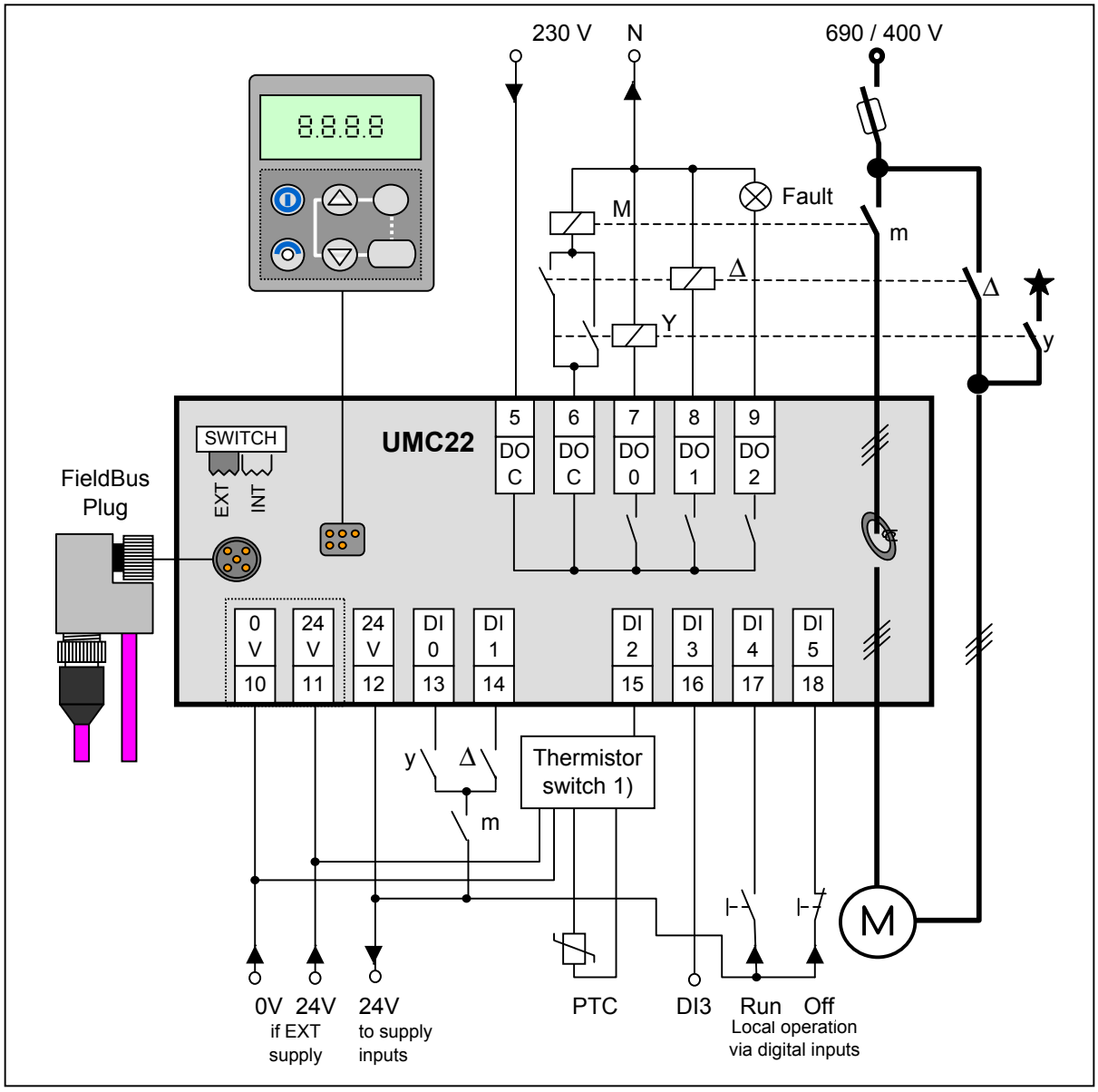
The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing set. Details see chapter "Planning and Commissioning".

Star-Delta-Starter 1 (continued)

Star-Delta-Starter with all possible extentions

Main features
- ► Motor contactor (star) at output DO0
- ► Motor contactor (delta) at output DO1
- ► Motor contactor (main) at aux.contacts
- ► Fault lamp at output DO2
- ► Check-back by aux.contacts (DI0, DI1)
- ► Fault input (closed circuit) at DI2
- ► Local operation via inputs DI4 and DI5

Parameters to be changed (based on default)
- ► Control function = Star-Delta-Starter
- ► Fault output = on
- ► Check-back = auxiliary contacts
- ► Fault Input = on
- ► Local operation via digital inputs = on
- ► Set current 1, overload parameters
- ► Address via Control Panel or Addressing Set



Remark: 1) Fault Input: Closed circuit signal: 1 = no fault
2) "Run": Momentary-contact switch
3) "Off": Closed circuit signal: 0 = dominating Off

Remark: For this case of motor wiring the 'Set current' must be set to 58% of the nominal motor current. Details see chapter "Commissioning","Motor current versus wiring".

Star-Delta-Starter 1 (continued)

Important:
The inputs and the internal electronic circuits are supplied normally by the FieldBusPlug "internally" (SWITCH to INT). Internal supply is also allowed for contacts next to the UMC22, when the 24 V wiring can be surveyed easily.
If distant contacts or sensors are connected, an external supply (SWITCH to EXT) must be used to avoid that an external short circuit paralyses the fieldbus (see chapter 'Internal 24 V / 0 V Connections').

Interface overview

Detailed information see appendix

Hardware Inputs / Outputs

Terminal	13	14	15	16	17	18
Device Input	**DI0*** (aux.cont)	**DI1** (to bus)	**DI2*** (ext.fault)	**DI3** (to bus)	**DI4*** (loc.:Fwd)	**DI5*** (local:Off)
Terminal	7	8	9			
Device Outputs	**star**	**delta**	**DO2*** (Fault out)			

* depending on parametrization

Fieldbus telegram: Monitoring signals / Commands

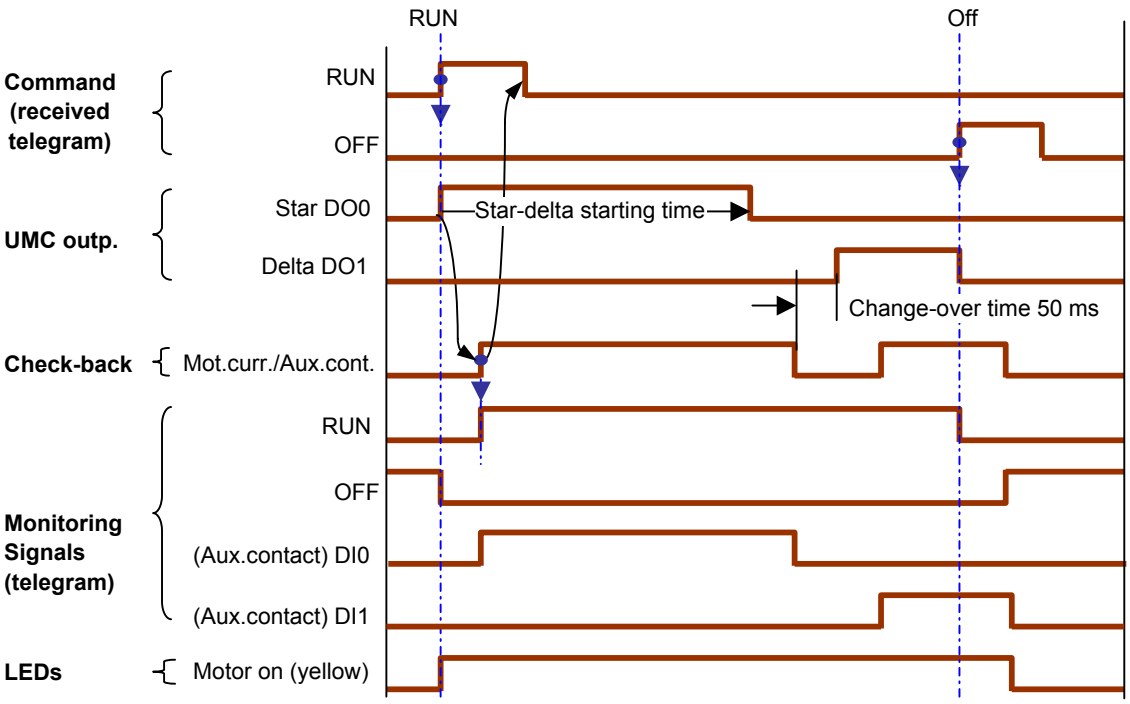
Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	**LOCAL CONTROL**	**-**	-	**RUN FORWARD**	**OFF**	**-**
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	**AUTO MODE**	-	**SELF TEST**	**RUN FORWARD**	**OFF**	**-**
Command Byte 1	**DO2*** (UMC output)	**-**	**-**	-	-	-	-	-

Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	-	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked**	**Communi-cation fault**	**Parameter out of range**	**Current check-back fault***	-	**Relay 1 check-back fault***	**Relay 0 check-back fault***
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	**-**	**Self test running**	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

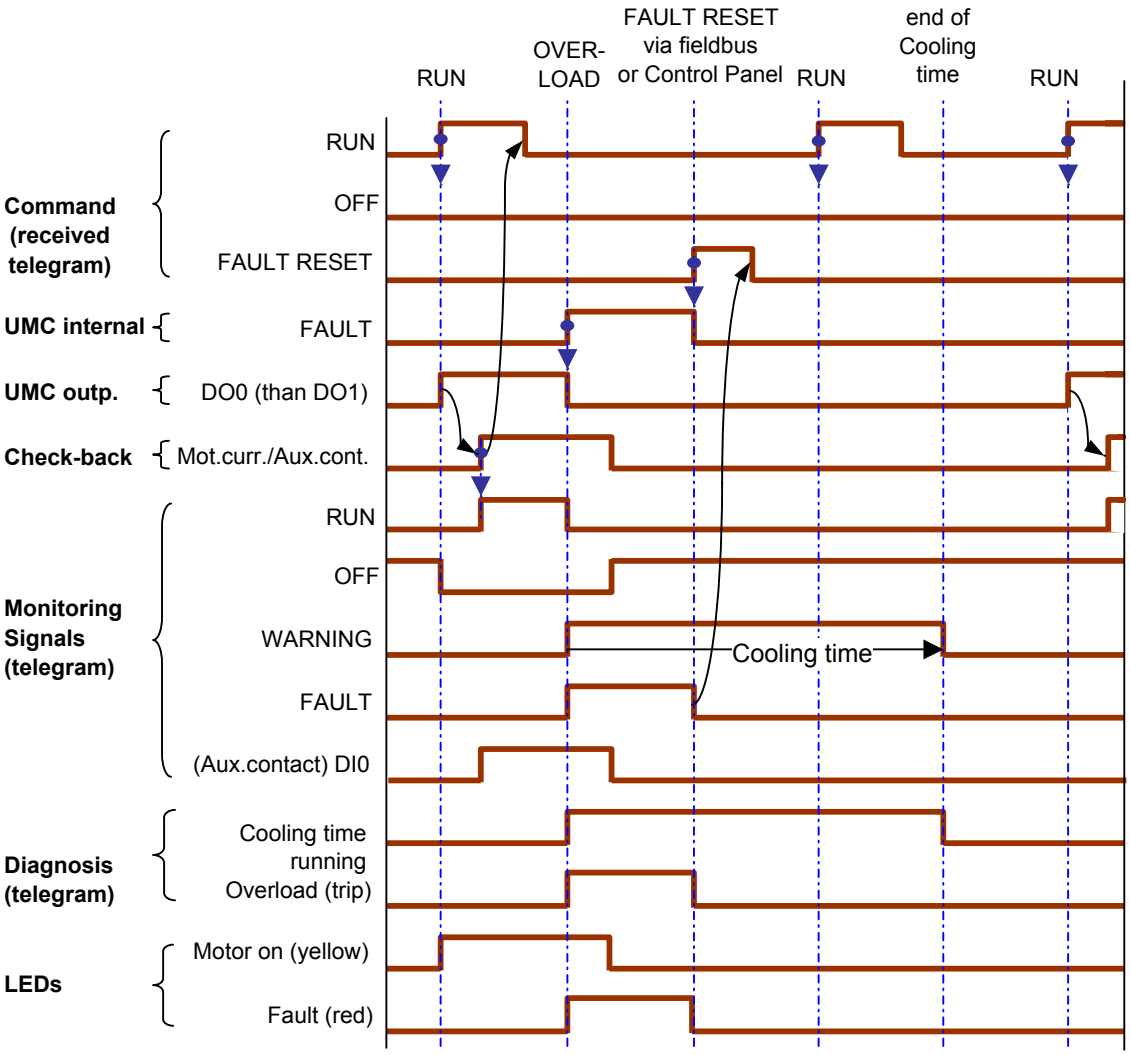
Star-Delta-Starter 1 (continued)

Timing Diagram 1: Star-Delta Start



Star-delta starter 1 (continued)

Timing Diagram 2: Overload



Pole-Changing Starter 1

The UMC22 parametrized with the 'Control function' = 'Pole-Changing Starter 1' provides excellent protection and control of a two-pole or Dahlander motor for one direction of rotation. The change from one speed to the other is possible immediately. The connection to a fieldbus is made via

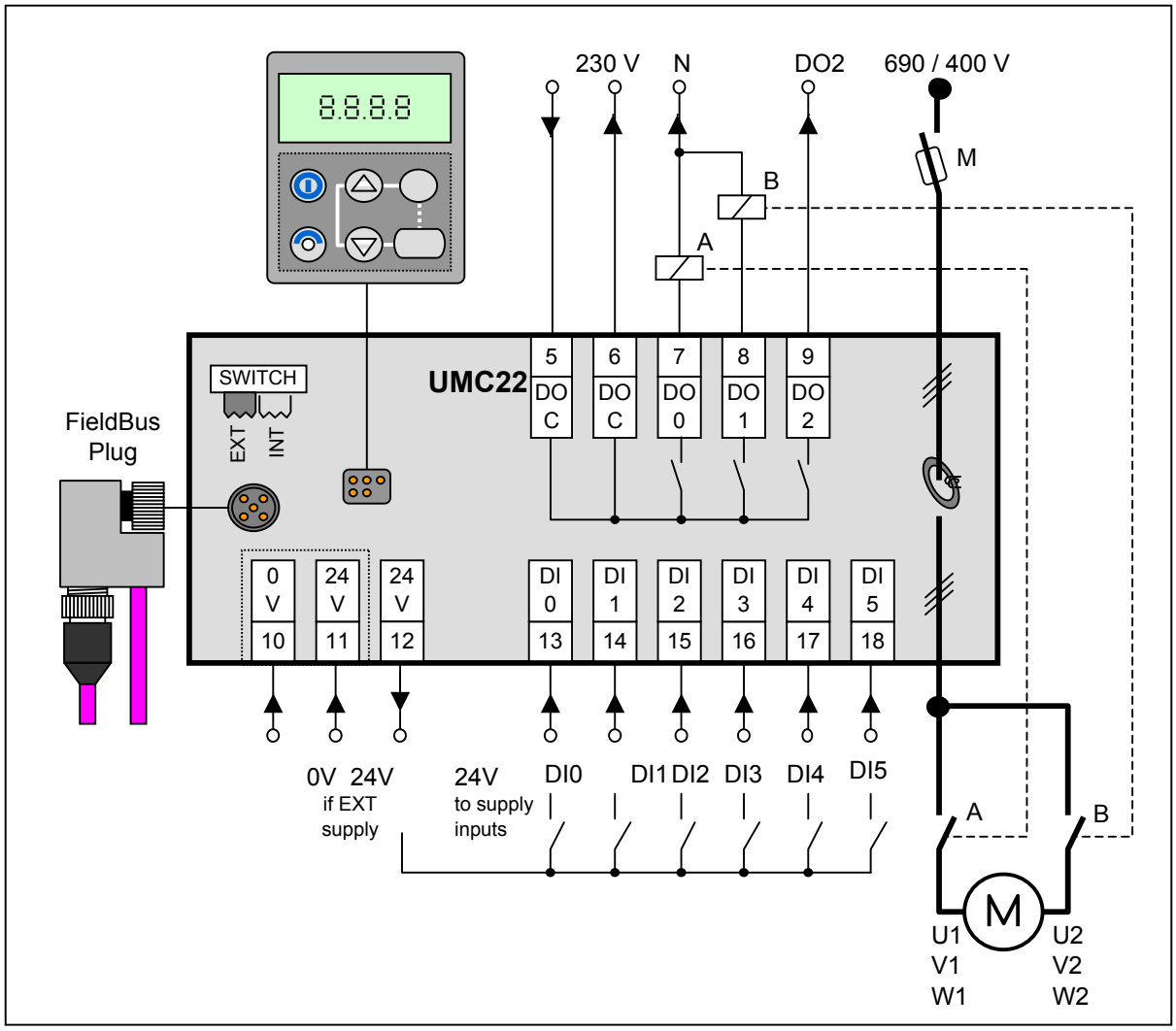
Basic circuit - Two-Pole Motor

Main features

- ► Motor contactor A at output DO0
- ► Motor contactor B at output DO1
- ► Check-back by current

Parameters to be changed (based on default)

- ► Control function = Pole-Changing Starter 1
- ► Address, Set current and Overload protection



Important:
Normally the inputs and the internal electronic circuits are supplied locally via the terminals 10 and 11. In this case the SWITCH must be set to EXT. The connection of distant contacts or sensors requests urgently this kind of supply.
If only contacts next to the UMC22 are used - that means the 24 V wiring can be surveyed easily - the supply via the fieldbus and the FieldBusPlug is possible (SWITCH to INT).
Details see chapter "Planning and commissioning", "Wiring and Internal 24V / 0V Connections".

Pole-Changing Starter 1 (continued)

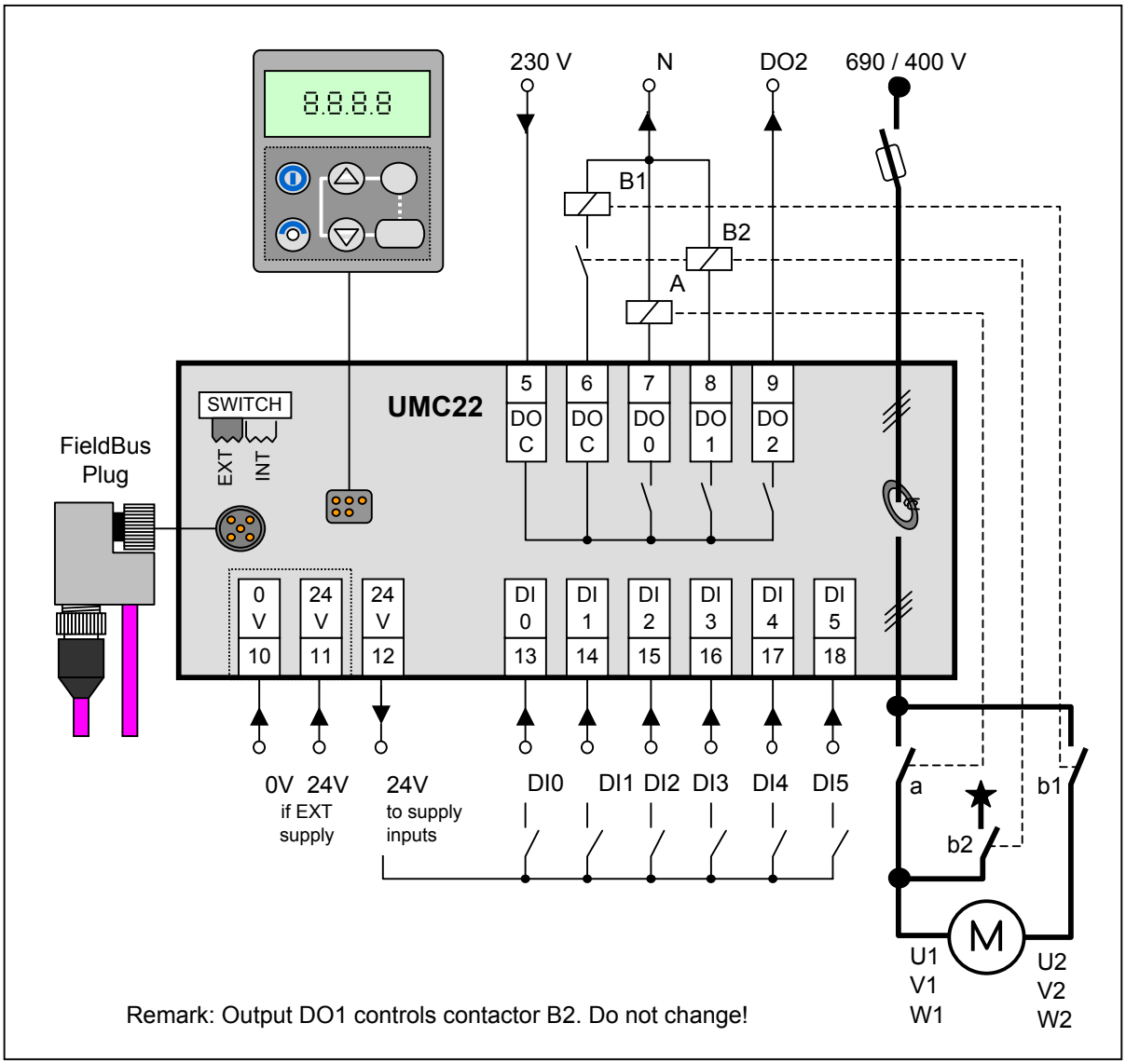
Basic circuit - Dahlander Motor

Main features

- ► Motor contactor A output DO0
- ► Motor contactor B2 at output DO1
- ► Motor contactor B1 via auxiliary contact of the contactor B2
- ► Check-back by current

Parameters to be changed (based on default)

- ► Control function = Pole-Changing Starter 1
- ► Address, Set current and Overload protection



Pole-Changing Starter 1 (continued)

Description

With 'Pole-Changing Starter 1' the outputs DO0 and DO1 are defined to drive the contactor coils as shown in the circuit diagrams. The contactors are locked electronically to avoid short circuit due to not extinct spark. The lock-out time is fixed 50 ms.
To keep this lock-out function for Dahlander start also the contactors A and B2 must be controlled by the UMC22 outputs. Contactor B1 is controlled by an auxiliary contact of the contactor B2.

Attached control functions

The parameter set 'Attached control functions' prepare the 'Pole-Changing Starter 1' to support different circuit arrangements including the use of inputs and outputs for particular use.
Examples:
'Fault output' = 'On': The output contact DO2 closes if a fault appears.
'Fault input' = 'On': A closed circuit signal (24 V) on input DI2 corresponds to the fault free status.
Remark: Only remaining outputs can be controlled but all inputs are monitored via fieldbus.

Other parameters define the protection behaviour and additional functions. Refer also chapter "Parameters...."
For the two speeds different set currents can be adjusted, see parameters 'Set Current 1' (relates to DO0) and 'Set Current 2' (DO1).

Starting

After setting the parameter 'Pole-Changing Starter 1' power on is necessary to activate and to allow to start the motor with the bus command RUN FORWARD (speed 1, contactor A), RUN REVERSE (speed 2, contactors B1 and B2) or via local control.

Change of the speed (A->B->A) is possible without restriction. Between the two speeds a lock-out time of about 100 ms is waited after current = 0 or auxiliary contact = off resp.

Check-back

When the motor is started the 'Check-back' status is expected within 300 ms, otherwise a fault is detected. Selectable by parameter, motor current or auxiliary contact signal can serve as check-back status.
Notice: 'Check-back'='Simulation' is recommended only to be set via Control Panel during commissioning. The control system must only set 'Auxiliary contacts' or 'Motor current' to guarantee that the check-back operates correctly after next power on.

Fault behaviour

All kinds of detected external and internal faults set the internal fault bit. In the following:
► contact DO0 (or DO1 resp.) for the contactor coil opens,
► the monitoring signal FAULT is sent to the fieldbus,
► the red LED lights on and
► the FAULT signal on the Control Panel display flashes.

If a motor overload is the cause of the fault signal, the 'Cooling time' is started additionally . The 'Cooling time' is a parameter and can be adjusted.
More detailed information are monitored in the diagnosis telegram and on the Control Panel.

All faults must be acknowledged via fieldbus or via Control Panel.
Additional the 'Cooling time' must be elapsed to allow to restart the motor with a 0-1 transition of the RUN FORWARD command.

Addressing

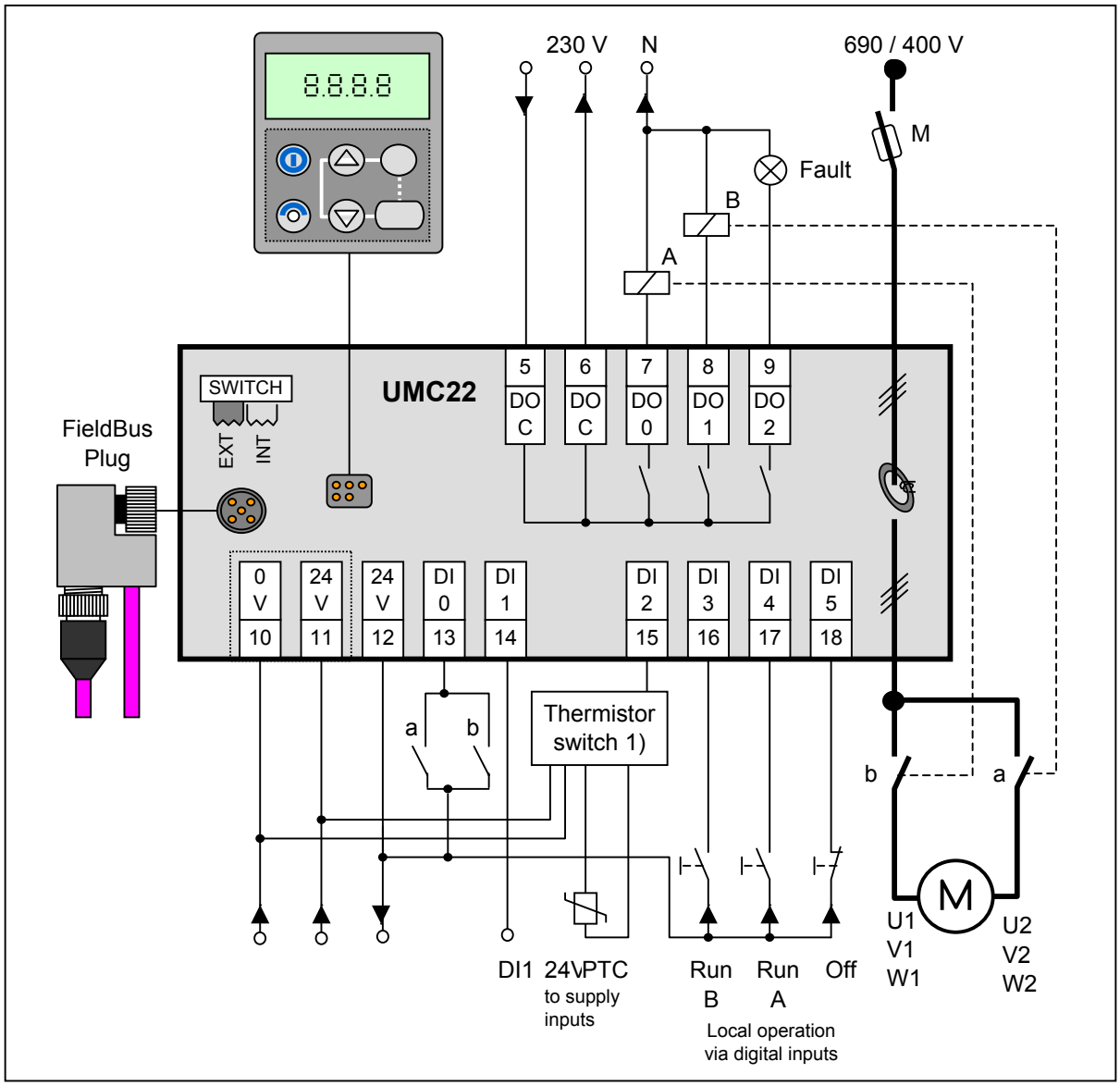
The slave address of the UMC22-FieldBusPlug combination is not a parameter but can be set with Control Panel or with separate Addressing set. Details see chapter "Planning and Commissioning".

Pole-Changing Starter 1 (continued)

Two-Pole Motor Starter with all possible extentions

Main features
- ► Motor contactor A at output DO0
- ► Motor contactor B at output DO1
- ► Fault lamp at output DO2
- ► Check-back by aux.contacts on DI0
- ► Fault input (closed circuit) at DI2
- ► Local operation via inputs DI4 and DI5

Parameters to be changed (based on default)
- ► Control function = Pole-Changing Starter 1
- ► Fault output = on
- ► Check-back = auxiliary contacts
- ► Fault Input = on
- ► Local operation via digital inputs = on
- ► Address, Set current and Overload protection



Remark:
1) Fault Input: Closed circuit signal: 1 = no fault
2) "Run A", "Run B": Momentary-contact switch
3) "Off": Closed circuit signal: 0 = dominating Off

Pole-Changing Starter 1 (continued)

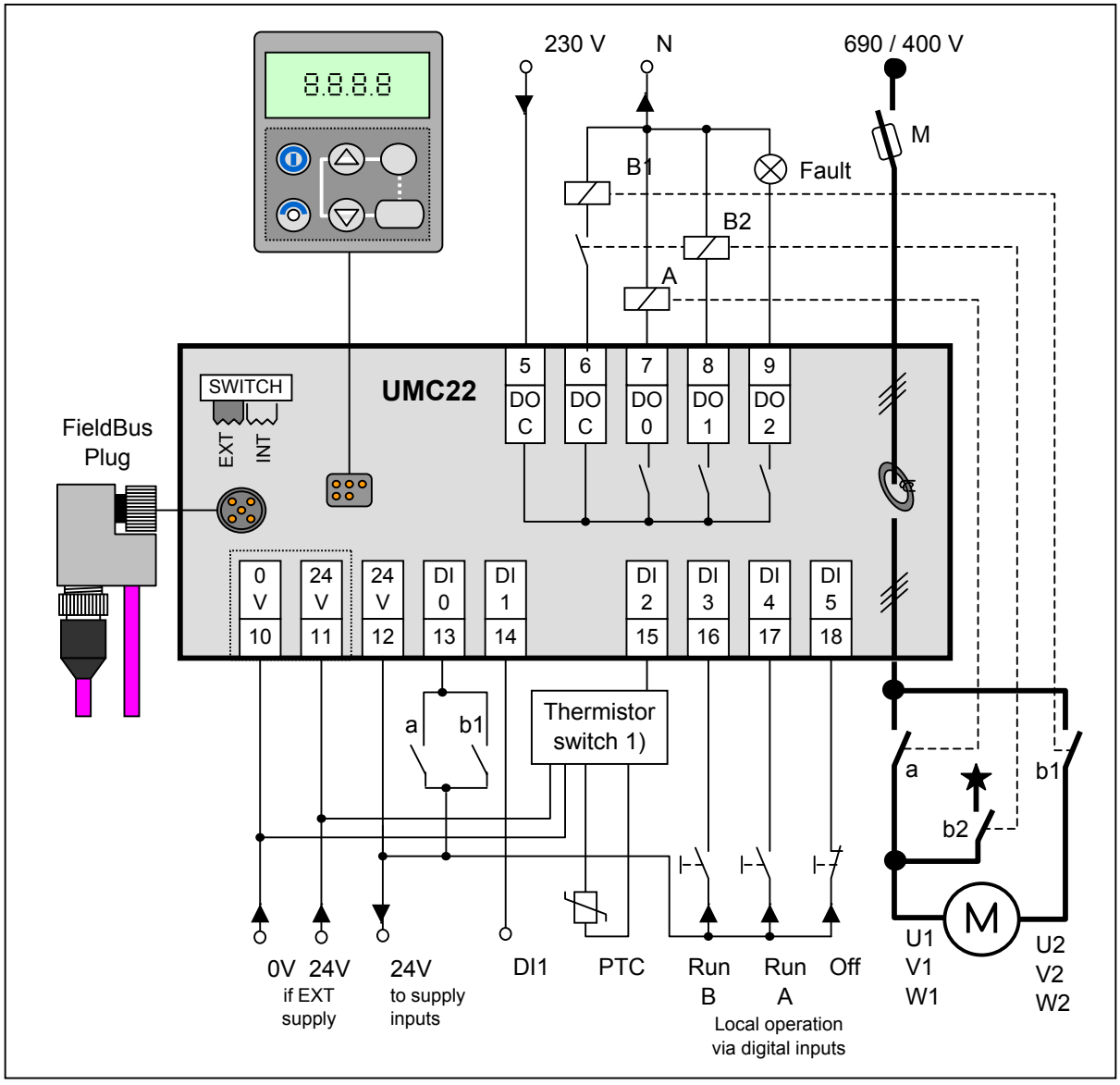
Dahlander Motor Starter with all possible extentions

Main features

- ► Motor contactor A at output DO0
- ► Motor contactor B2 at output DO1
- ► Motor contactor B1 via auxiliary contact of the contactor B2
- ► Fault lamp at output DO2
- ► Check-back by aux.contacts on DI0
- ► Fault input (closed circuit) at DI2
- ► Local operation via inputs DI4 and DI5

Parameters to be changed (based on default)

- ► Control function = Pole-Changing Starter 1
- ► Fault output = on
- ► Check-back = auxiliary contacts
- ► Fault Input = on
- ► Local operation via digital inputs = on
- ► Address, Set current and Overload protection



Remark: 1) B2 controls B1, do not change!
2) Fault Input: Closed circuit signal: 1 = no fault
3) "Run A", "Run B": Momentary-contact switch
4) "Off": Closed circuit signal: 0 = dominating Off

Pole-Changing Starter 1 (continued)

Important:
The inputs and the internal electronic circuits are supplied normally by the FieldBusPlug "internally" (SWITCH to INT). Internal supply is also allowed for contacts next to the UMC22, when the 24 V wiring can be surveyed easily.
If distant contacts or sensors are connected, an external supply (SWITCH to EXT) must be used to avoid that an external short circuit paralyses the fieldbus (see chapter 'Internal 24 V / 0 V Connections').

Detailed information see appendix

Interface overview

Hardware Inputs / Outputs (all digital inputs are monitored to the bus)

Terminal	13	14	15	16	17	18
Device Input	**DI0** (aux.cont)	**DI1** (to bus)	**DI2** (ext.fault)	**DI3** (local:B1)	**DI4** (local: A)	**DI5** (local:Off)
Terminal	7	8	9			
Device Outputs	**DO0** (cont.A)	**DO1** (cont.B1)	**DO2*** (fault out)			

* depending on parametrization

Fieldbus telegram: Monitoring signals / Commands

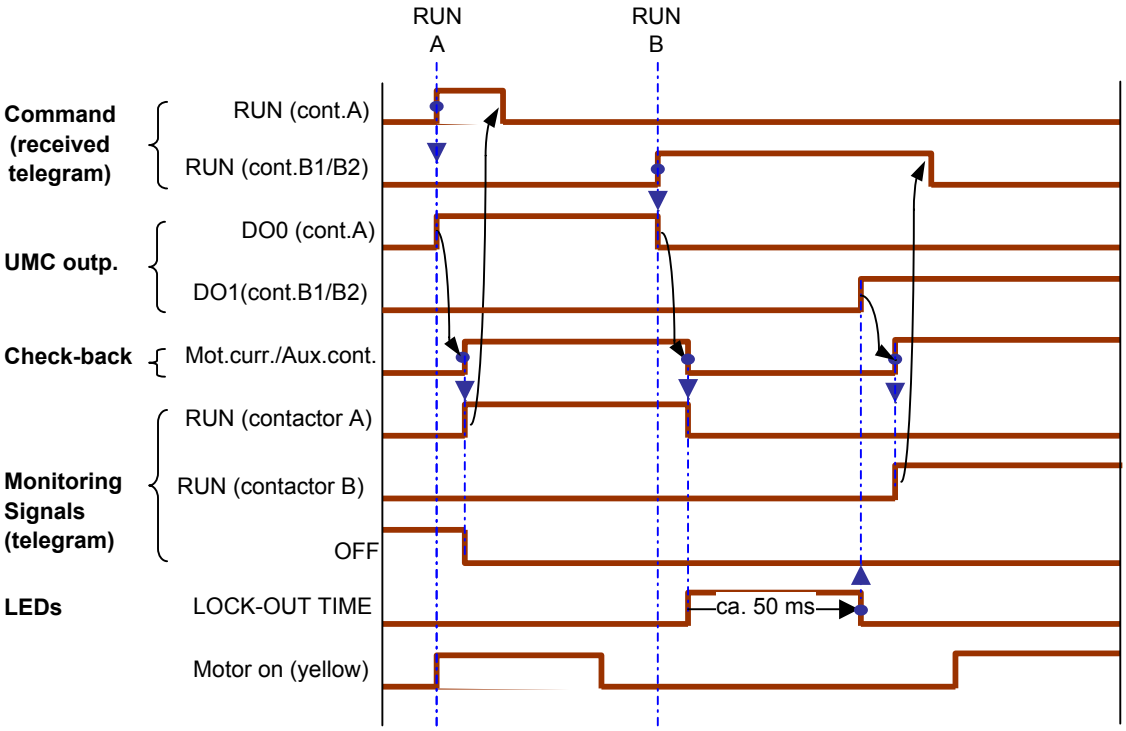
Bit No.	7	6	5	4	3	2	1	0
Monitor Byte 0	**WARNING**	**FAULT**	**LOCAL CONTROL**	-	-	**RUN FWD** (cont.A)	**OFF**	**RUN REV** (cont.B1)
Monitor Byte 1	**DI5** (UMC input)	**DI4** (UMC input)	**DI3** (UMC input)	**DI2** (UMC input)	**DI1** (UMC input)	**DI0** (UMC input)	**-**	-
Monitor Byte 2/3	**MOTOR CURRENT (% of Set current)**							
Command Byte 0	-	**FAULT RESET**	**AUTO MODE**	-	**SELF TEST**	**RUN FORWARD**	**OFF**	**RUN REVERSE**
Command Byte 1	**DO2*** (UMC output)	**-**	**-**	-	-	-	-	-

Fieldbus telegram: Diagnosis

Bit No.	7	6	5	4	3	2	1	0
Fault Byte 0	-	**Self test failed**	**Fault input**	-	-	-	-	-
Fault Byte 1	**Overload (trip) fault**	**Motor blocked**	**Communi-cation fault**	**Parameter out of range**	**Current check-back fault***	-	**-**	**Relay 0 check-back fault***
Warning Byte 2	**Motor cur-rent high threshold***	**Motor cur-rent low threshold***	**Para-meter unknown**	**Cooling time running**	-	-	-	-
Warning Byte 3	**Parameter number** (refers to Byte1, Bit 4)							

Pole-Changing Starter 1 (continued)

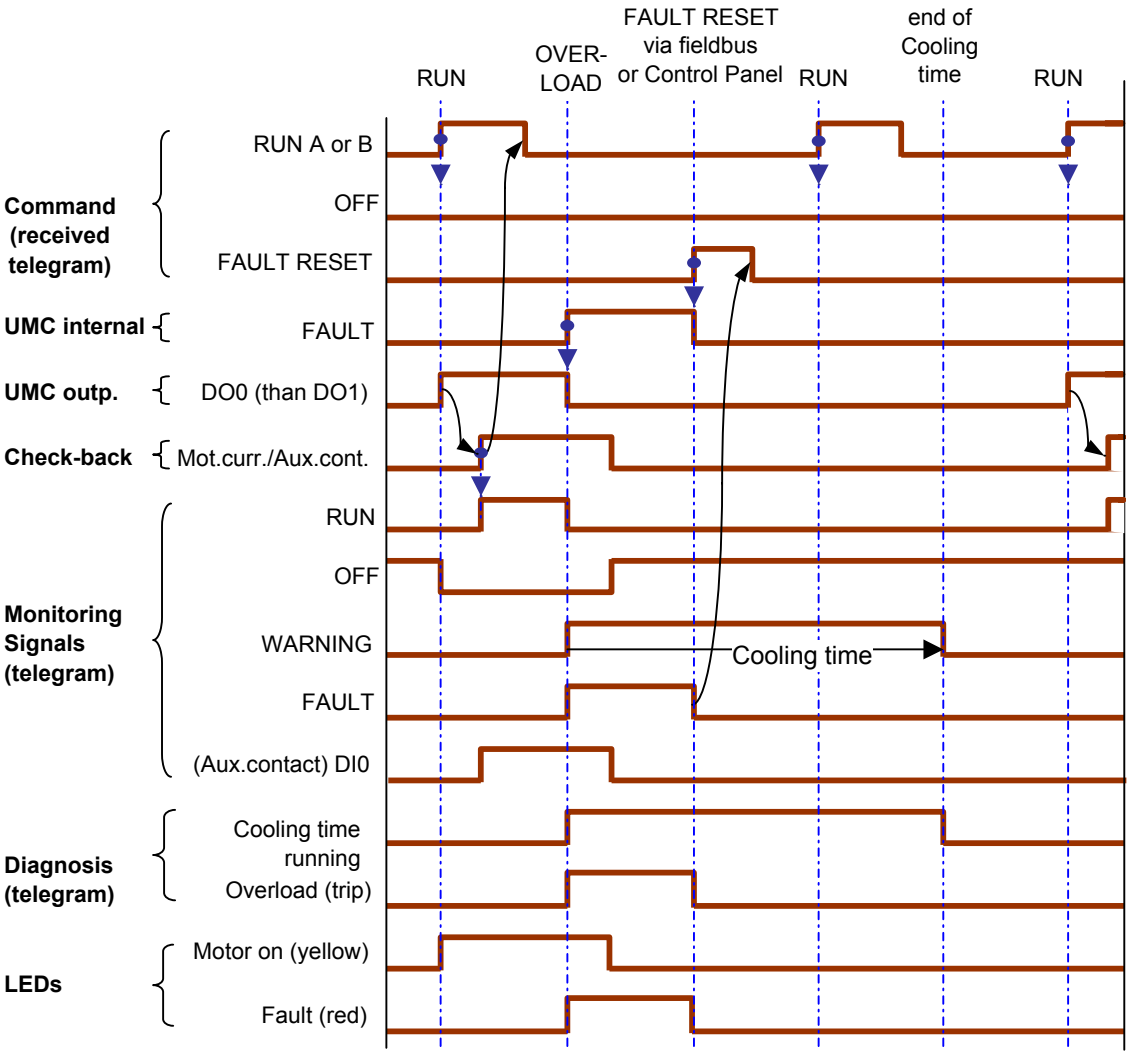
Timing Diagram 1: Change Speed



Remark: Restart with the same speed without delay.

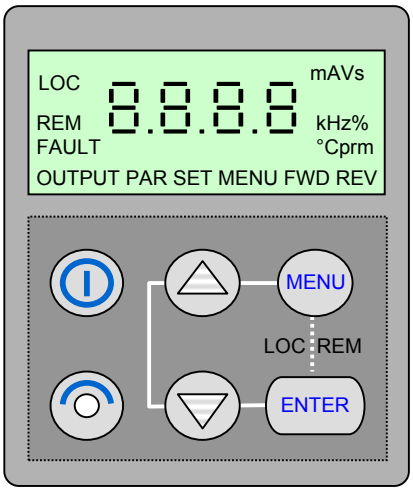
Pole-Changing Starter 1 (continued)

Timing Diagram 2: Overload



Appendix B: Control Panel, Overview

The Control Panel ACS100-PAN offers the selection of a limited set of functions in 3 Levels:



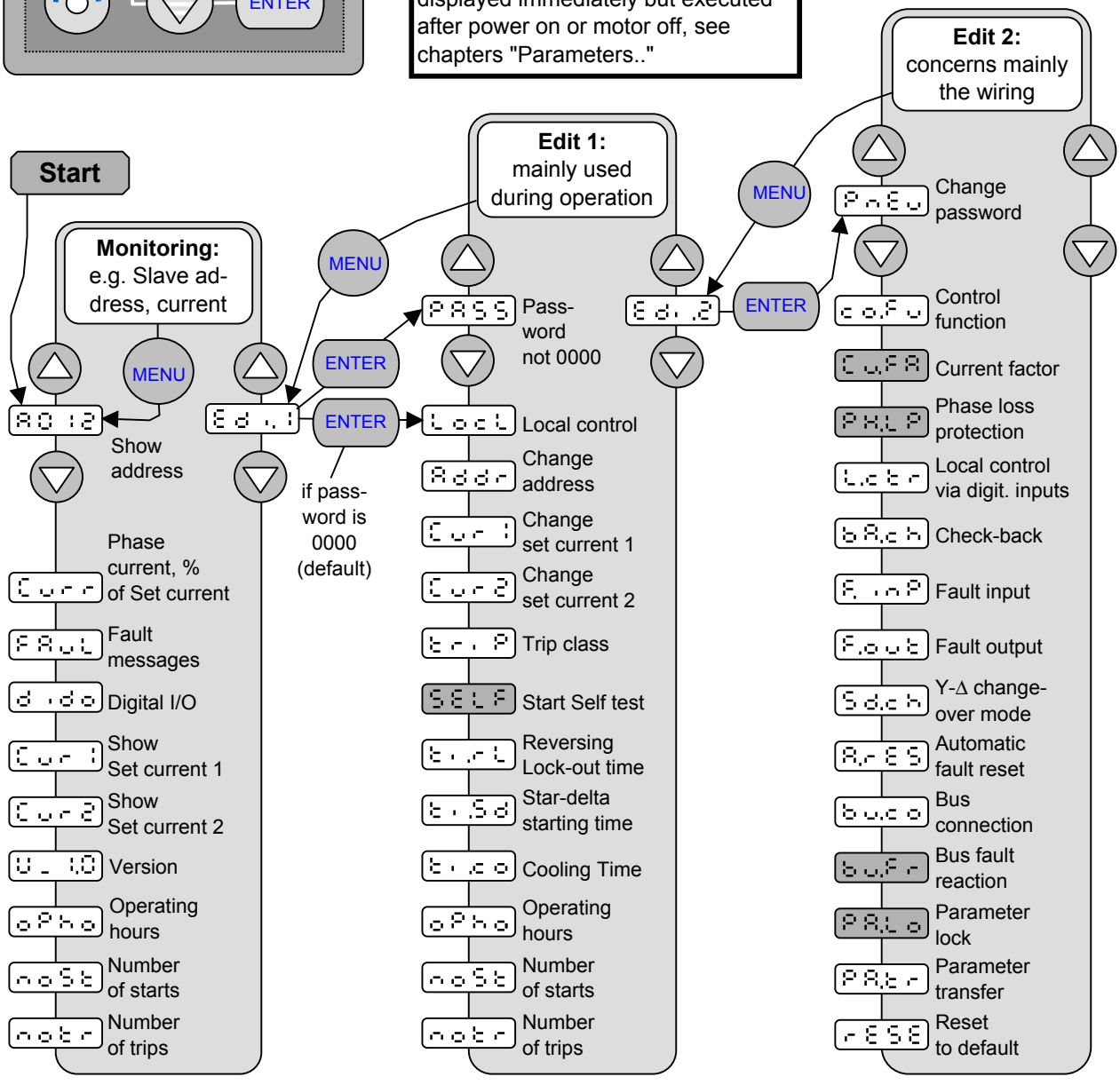
ENTER → Go to higher menu level or change/save value

PAR or LOC → Control panel in Edit 1 or 2

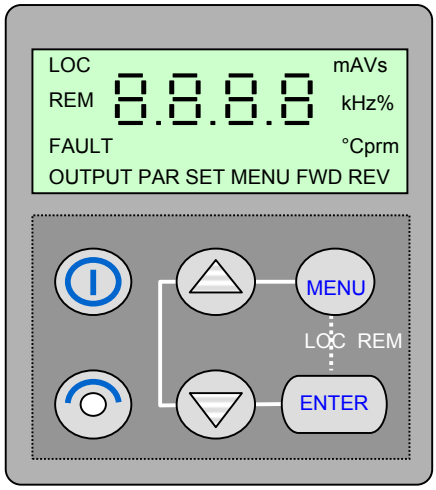
SET → Edit 1 or 2: Ready to change the value

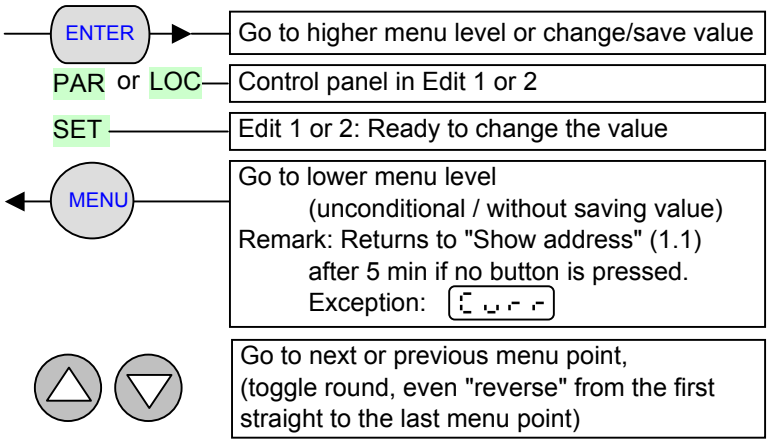
MENU → Go to lower menu level
(unconditional / without saving value)
Remark: Returns to "Show address" (1.1)
after 5 min if no button is pressed.
Exception: Curr

Attention: Changed Parameters are displayed immediately but executed after power on or motor off, see chapters "Parameters.."



Appendix B: Control Panel, Menu





Monitoring

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Param no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
-	1.1	**Show address**	A01:2 A---	no	depending on bus	Actual slave address Invalid / no address	-
-	1.2	**Actual current**	Curr			Highest current of one of the 3 phases:	-
-	1.2.1	show	C:13		0 - 640%	Actual current in % of Set current, release over the bus 1/32 = 3,125 %	
-	1.3	**Fault messages**	FAuL F---			With [ENTER]: - the first of the existing faults is shown, - with [Cursor] to other existing faults. If no fault	-
	1.3.1	Overload fault	Err.P			Overload or phase loss has lead to trip. Cooling time has started. (as long as the cooling time is running the **°C** on the disply flashes) Acknowledge is possible when Cooling time has elapsed. Restart of motor needs: * Acknowledge and * 0-1 transition of RUN FORWARD/REVERSE Remark: Blocking causes also Overload fault. In this case Cooling time is not started.	
	1.3.1.1	Acknowledge	Ackn			To acknowledge the Overload fault: [ENTER]. ---> Procedure is similar for all other faults	
	1.3.2	Motor blocked	F002			Blocking current limit is exeeded	

Monitoring
(continued)

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
-	**1.3**	**Fault messages (continued)**					-
	1.3.3	Communication fault	F003			No connection to control system (any fault or interruption of FieldBusPlug, Fieldbus, PLC...). - When the communication is correct again after fault the motor can be started imme-diately without Fault acknowledge. - Communication also can appear when the address in the FieldBusPlug and the UMC22 are different. Details see chapter "Commissioning","Connection to the Fieldbus, Addressing".	
	1.3.4	Parameter out of range	F004			entered parameter exeeds low or high limit	
	1.3.5	Current check-back fault	F005			Motor current doesn't flow latest 300 ms after switching on or doesn't go to 0 latest 100 ms after switching off.	
	1.3.6	Check-back fault DI2	F006			Signal on DI2 does not appear latest 300 ms after switching on or does not disappear latest 300 ms after switching off.	
	1.3.7	Check-back fault DI1	F007			dto. For DI1	
	1.3.8	Check-back fault DI0	F008			dto. For DI0	
	1.3.10	Self test failed	F010			Self test failed, e.g. CRC check not ok. Can not be achnowledged.	
	1.3.11	Fault input = 0	F011			Closed circuit at DI2 interrupted (supposed DI2 is parametrized as 'Fault input')	
-	**1.4**	**Digital I/O**	d.do				-
	1.4.0	DI0	d.000			Example: 0 signal at digital input 0	
	:	DI1...DI5...DO0..DO1	:			:	
	1.4.8	DO 2	do2.1			Example: 1 signal at digital output 2	
	1.4.9	Status DI, DO	dnrr			* Left place of the display: 'd' for digital I/O status * Upper vertical lines of the 2 right places: Signal status of the 3 digital outputs, from DO0 (right) to DO2 (left). Line visible = 1. * Lower vertical lines of the 3 right places: Signal status of the 6 digital inputs, from DI0 (right) to DI5 (left). Line visible = 1. * Horizontal lines: Shall help to find I/O number. Example shown left: DO-Nr. : 0,1,2 DO-Status: **1 0 1** DI-Status: 1 1 1 0 1 0 DI-Nr. : 0,1,2,3,4,5	

Monitoring
(continued)

- ► Some changed parameters are taken over after motor off, others during power on.
- ► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
01	1.5	**Show Set current 1**	Cur 1			The UMC22 measures the currents of the lines in the bushing holes. √3 (inner delta) wiring or / and an external current transformer result in a higher power line current. To show e.g. the real rated motor current the 'Current factor' can bechanged, see menu point 'Current factor' in level 'Edit 2'. Depending on the 'Current factor' the number of stages before the decimal point fits to the desired range.	-
	1.5.1	show	10.00 100.0 1000		0.24-63.00 0.42 -109.0 50 - 3200	1) Displayed range for 'Current factor' = 1.0 (1.0 = default) 2) Displayed range for 'Current factor' = 1.7 (for √3 (inner delta) circuitry) 3) Displayed range for 'Current factor' > 10 (for external current transformer, secondary current 5A)	
03	1.6	**Show Set current 2**	Cur2			Set current of winding 2 of 2-speed-motors.	-
	1.6.1	show				see 'Show Set current 1'	
-	1.7	**Version**	U 3.0			Firmware-version of UMC22	-
18	1.8	**Operating hours**	oPHo				-
	1.8.1		00.00	0	0 - 99'999	All hours are counted but the unit place is not displayed on the Control Panel. The displayed range 00.00 - 99.99 corresponds with real 00'000 to 99'999 hours	
19	1.9	**Number of starts**	noSt				-
	1.9.1		0000	0	0-1000'000	All starts are counted but the three lower places are not displayed on the Control Panel. The displayed range 0000-1000 corresponds with real 0000'000 - 1000'000 starts	
25	1.10	**Number of trips**	notr				-
	1.10.1		0000	0	0 - 255	displays 0000 - 0255 trips	
-	1.11 to 2.1	**Edit 1**	Ed .1			Go to Local control, to parameters for motor protection and times with [ENTER].	-

Edit 1

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
-	2.1	**Password**	PASS			skipped to 2.2 if the password (default 0000) is not changed	imme-diately
-	2.1.1	****	0000	0	0001-9999	- At any time back with [MENU] without saving. - 0000 is default and does not act as password. - First position flashes, change with [Cursor], press [ENTER], ..., 4th number flashes, change with [CURSOR], after position 4 (4!) save with [ENTER]. -->	
-	2.2	**Local control**	LocL			- Local control is always possible. If entered RUN commands from the control station are ignored. - Entering and leaving Local control does not influence the actual status of the outputs. - Local control is left immediately when Control Panel is removed.	-
-	2.2.1	select direction switch on and off	C113			- Entering and leaving this menu point does not influence the actual status of the outputs. - Off is always possible and dominating via control system, Control Panel and, if para-metrized, via digital input DI0. - Toggle On/Off of relay outputs, On incl. start procedure and check-back. - Reverse Starter: Selection of the other direction is possible if ~ motor is stopped via button AND ~ reverse lock-out time has elapsed. - Pole changing starter: switch over to the other speed is executed immediately (change-over time ca. 100 ms). Display: Speed 1=FWD Speed 2=REV.	
-	2.3	**Address**	Addr				-
	2.3.1	show / change	A023 A---	A000	depending on bus type	- entered address: here 23. = no address - Entering 999 results in 'no address'	

Edit 1
(continued)

► Some changed parameters are taken over after motor off, others during power on.
► Some control systems or fieldbuses overwrite the parameters during power on of the UMC22. In this case the Control Panel seems to be but is not ineffective.

Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
01	2.4	**Set current 1**	CUr 1			The UMC22 measures the currents of the lines in the bushing holes. √3 (inner delta) wiring or / and an external current transformer result in a higher power line current. If the 'Set current' shall include the 'Current factor' to show e.g. real rated motor current the 'Current factor' must be changed before or together with the 'Set current'. Depending on the 'Current factor' the number of stages before the decimal point fits to the desired range. More details see menu point "Current factor" and chapters "Planning, Commissioning and Maintenance", "Motor Current = Set current versus Wiring" and "External Current transformers for Higher Currents". With [Enter]:	during motor off
	2.4.1	show / change	10.00 100.0 1000	0,5A	1) 0.24- 63.00 2) 0.42 -109.0 3) 50 - 3200	1) If 'Current factor' = 1.00 (Default) 2 stages before decimal point. 2) If 'Current factor' = 1.7 internally corrected into 1.73, used for √3 (inner delta) circuitry: 3 stages before decimal point. 3) If 'Current factor' = 10 - 640 used for external current transformers, (secondary current = 5 A): 4 stages before decimal point.	
03	2.5	**Set current 2**	CUr2			Set current of winding 2 of 2-speed-motors.	during motor off
	2.5.1	show / change	0 1.00	0,5A	0,24 - 63A or more	see 'Change Set current 1'	
04	2.6	**Trip class**	tr.P			overload check (thermal motor image)	during motor off
	2.6.1	Trip class 5	tr 5				
	2.6.2	Trip class 10	tr 10	10			
	2.6.3	Trip class 20	tr20				
	2.6.4	Trip class 30	tr30				
-	2.7	**Self Test (Overload)**	SELF			Tests different functions, creates an overload and checks the correct trip time. **Attention:** Starting thes Self Test (Overload) sets the motor temperature model to zero. This means a warmed up motor is not protected correctly. With [ENTER] to:	-
	2.7.1		Acno			start with [ENTER]	
	2.7.2		busy			shows the correct test run. It must be checked.	

Edit 1
(continued)

► Some changed parameters are taken over after motor off, others during power on.
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Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
17	2.8	**Reversing lock-out time**	t. rL			--> Only for Reversing Starters! - starts with OFF (OFF is necessarry between FORWARD and REVERSE) - Command 'RUN' in other direction is not accepted while lock-out time is running. (adjusting 0 results in 0.2)	during motor off
	2.8.1	show / change	0002	2s	0.2-3600s	show and change lock-out time in steps of 1s	
16	2.9	**Star-delta starting time**	t. Sd			only for Star-Delta Starter, starts running with the RUN command	during motor off
	2.9.1	show / change	0060	60s	0 - 3600s	show / change star-delta starting time in steps of 1s	
10	2.10	**Cooling Time**	t. Co				during motor off
	2.10.1	show / change	0 120	120s	0 - 3600s	show / change Cooling time time in steps of 1s	
18	2.11	**Operating hours**	oPHo				during mot.off
	2.11.1	show / change	0000	0	0 - 99'999	displays 00.00 - 99.99 thousands of hours	
19	2.12	**Number of starts**	noSt				during motor off
	2.12.1	show / change	0000	0	0-1000'000	All hours are counted but the unit place is not displayed on the Control Panel. The displayed range 00.00 - 99.99 corresponds with real 00'000 to 99'999 hours	
25	2.13	**Number of trips**	notr				during motor off
	2.13.1	show / change	0000	0	0 - 255	All starts are counted but the three lower places are not displayed on the Control Panel. The displayed range 0000-1000 corresponds with real 0000'000 - 1000'000 starts	
-	2.14 to 3.1	**Edit 2**	Ed. 2			Go to next operation level.	-

Edit 2

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Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
-	**3.1**	**Change password**	PASS				-
-	**3.1.1**	show / change	1234	0000	0001-9999	show and change password	
12	**3.2**	**Control function**	co.Fu				Power up trans-ition
	3.2.1	Transparent mode	c.trA	Trans.		Direct access to DIs/DOs via fieldbus	
	3.2.2	Overload relay	c.oUL			Similar to overload relay	
	3.2.3	Direct Starter	c.d ir			Direct start with check-back	
	3.2.4	Reversing starter	c.rEU			Reverse start with check-back	
	3.2.5	Star-delta starter 1	c.Sd 1			Star-delta start via 2 DOs, with check-back	
	3.2.6	Pole changing starter 1	c.Pch			Pole changing start witch check-back type 1	
02	**3.3**	**Current factor**	CurFA			The UMC22 measures the currents of the lines in the bushing holes. √3 (inner delta) wiring or / and an external current transformer result in a higher power line current. If the 'Set current' shall include the 'Current factor' to show e.g. real rated motor current the 'Current factor' must be changed before or together with the 'Set current'. Depending on the 'Current factor' the number of stages before the decimal point fits to the desired range.	during motor off
				1.0	1) 1.0 2) 1.7 3) 10-640	1) Current range: 0.24 - 63.00 A (2 stages before decimal point). 2) Current range: 0.4 - 109.0 A 1.7 is internally corrected into 1.73, used for √3 (inner delta) circuitry: 3 stages before decimal point. 3) Current range: 50 - 3200 A used for external current transformers, (secondary current = 5 A): 4 stages before decimal point. See also the chapters "Planning, Commis-sioning and Maintenance", "Motor Current = Set current versus Wiring" and "External Current transformers for Higher Currents". With [Enter]:	during motor off
	3.3.1		000.0	1.0		Procedure see "Address"	
06	**3.4**	**Phase loss protection**	PhLP			Fault if the actual current of one phase (or two phases) hase less than 50% of the actual current in the other phases. But: The Phase loss protection operates correct only when the actual current of at least one phase is 70% or more of the 'Set current'.	during motor
06	**3.4.1**	Off	PHoF			no detection of a phase loss	off
06	**3.4.2**	On	PHon	On		a phase loss sets the internal fault signal	

Edit 2
(continued)

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Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
22	3.5	**Local control via digital inputs**	LCtr	No opera.			during motor off
	3.5.1	No operation via inputs	LCoF			Inputs DI3 - DI5 are not used for local control	
	3.5.2	Operation via inputs	LCon			Digital inputs prepared to control RUN/ STOP locally. Remark: Local control ist possible when - control system sends Command AUTO MODE = 0 or - Communication to control system is interrupted.	
13	3.6.	**Check-back**	bACh				during during motor off
	3.6.0	Auxiliary contacts	bAAu			ok when auxiliary contacts are closed 100 ms after start	
	3.6.1	Motor current	bACu	current		ok when current 100 ms after start	
	3.6.2	Simulation	bASi			simulated check-back (e.g. to be set to operation without motor). Remark: Normally overwritten by the control system during power on, see chapter "Parameters..."	
21	3.7	**Fault input**	FInP			Digital input DI2 to for external Fault signal, closed-circuit	during motor off
	3.7.0	Off	FioF	Off		Off. Digital input free available.	
	3.7.1	On	Fion			On. Signal 1 on DI2 is requested. If DI2 = 0 internal fault signal is set.	
24	3.8	**Fault output**	FOut			Digital output DO2 used to monitor Fault signal	during motor off
	3.8.0	Off	FooF	Off		Off. Digital output free available.	
	3.8.1	On	Foon			On. Digital output DO2 monitors Fault signal.	
15	3.9	**Star-delta changeover mode**	Sdch			--> only needed for star-delta starter Change to delta, when:	during motor off
	3.9.1	Time	Sdti			star---> delta when star-delta starting time is over	
	3.9.2	Current	Sdcu	curr.		star--->delta when motor current = 0,9 * Is. Remark: Must switch to delta before 'Star-delta starting time' has elapsed otherwise 'Current check back fault'.	
11	3.10	**Automatic fault reset**	ArES			Automatic fault reset (On) is only possible with the control function 'Overload'	during motor off
	3.10.0	not resetted automatically	ArnF	not reset		Fault has to be resetted via Control Panel or via Fieldbus	
	3.10.1	automatic reset	Aron			Automatic reset of Fault when fault condition is off and cooling time has elapsed. Fault is not monitored.	

Edit 2
(continued)

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Param. no.	Menu no.	Menu point name	Display: 7-segm.	De-fault	Range	Description / remark	take over
-	**3.11**	**Bus connection**	bus.co				power up transition
	3.11.0	Stand alone	bus.oF			Stand alone / without bus communication, via digital inputs and Control panel	
	3.11.1	Bus connection	bus.on	bus comm.		Operation with bus communication	
-	**3.12**	**Bus fault reaction**	bus.Fr			All cases when UMC does not receive valid telegrams, either when the control system or the fieldbus or the FieldBus-Plug is out of order or interrupted	during motor off
	3.12.1	Off	bs.oFF	Off		Relays off	
	3.12.2	On	bs.rEt			Relays retain status	
-	**3.13**	**Parameter lock**	PA.Lo			Locks writing all parameters via control system / fieldbus and via Control Panel	imme-diately
	3.13.1	Enabled	P.EnA	Off		Writing parameters enabled	
	3.13.2	Locked	P.Loc			Writing parameters locked	
-	**3.14**	**Parameter transfer**	PA.tr			Control panel can read and write the complete parameter set from / to UMC22 except fieldbus slave address.	power up trans-ition
	3.14.1	Read parameters	PA.rE			Control panel reads the actual parameters from the UMC22 with [ENTER]	
	3.14.2	Set parameters	PA.SE			Control panel overwirtes the actual parameters in the UMC22 with [ENTER]	
-	**3.15**	**Reset to Default**	rESE				power up trans-ition
	3.15.1	execute	rESE			Go back to default values with [ENTER]. Fieldbus slave address, Operating hours, Number of starts and Number of trips are not changed.	

Manual No.: 2CDC 135 004 D 0202

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