INTRODUCTION

The Brodersen monitoring relays are high quality products incorporating up-to-date circuit design together with modern, efficient components to ensure a long trouble free life in a wide range of operating conditions.
Power consumption and, thus, heat dissipation are minimal and the entire range has been de-signed and tested to the latest requirements for EMC immunity and emission.

A wide range of commonly used standards of voltage, current, temperature and process signals can be monitored by the Brodersen relays.

The Brodersen Control and Monitoring relays are produced in two design categories; installation and industrial design. The installation design is based on DIN rail or 11 pole plug-in mounting and are designed to fit into installation enclosures. The industrial design is in 22,5mm housing with the terminals placed to optimize installation time in industrial applications.

MCU-10
Digital control relay

MCP-10
Phase monitoring relay

SELECTION GUIDE

	Input								Output		Display		Adjustments			
	AC/DC Voltage	AC/DC Current	3-phase Voltage	3-phase Monitoring	Temperature RTDs	Temperature Thermocouples	Liquid Level, Conductive	Standard Process Signal	Output Relay	Analogue Output, Setpoint Analogue Output, Measuring	LCD Display LED Indication		Setpoints	Hysteretis	Delay	
Description															**Type**	**Page**
36mm Installation Design for Din Rail or 11-Pole Plug-In Mounting			●						●		●				Phase monitoring relay	MCP-10	38
	●								●		●	●	●		Digital voltage relay	MCU-10 DV/AV	40
		●							●		●	●	●		Digital current relay	MCU-10 DC/AC	42
					●				●		●	●	●		Digital thermostat relay	MCU-10 P/N/T	44
						●			●		●	●	●		Digital thermostat relay	MCU-10 J/K/S/R	46
								●	●		●	●	●		Digital process signal relay	MCU-10 U	48

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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

DESCRIPTION

Control relay for monitoring of correct phase sequence, phase break and undervoltage.
Connection to 3-phase mains supply with or without neutral. Fixed limits for energizing and de-energizing the single or double output relay. LED indication of supply voltage and phase failure.
Versions available for DIN rail or 11-pole plug-in base mounting.
Versions available for separate supply and measuring voltage.

OPERATION

The phase failure relay monitors phase sequence, phase break and undervoltage.
The output relay is energized when all three phase voltages are present and the phase conditions (voltage and phase sequence) are correct.
The phase failure relay has a fixed time delay to prevent faulty energization and de-energization caused by short interferences.
LED indication of supply voltage connected (green) and phase or voltage failure (red).
The phase failure relay uses L2 and L3 (6 and 7) for supply voltage. The indicators therefore only work if these phases are present.
An improvement of the measuring range is obtained by connecting neutral to the relay (see the technical data).

OPTION

Separate supply and measuring voltage S.
The supply voltage for the internal circuit is separated from the measuring voltage which allows the measuring circuit and the LED indicators to work if one or more of the monitored phases are interrupted.

VERSIONS/ORDERING CODES

MCP-10 S 1 380 /S230

Type:
Phase failure relay. MCP-10

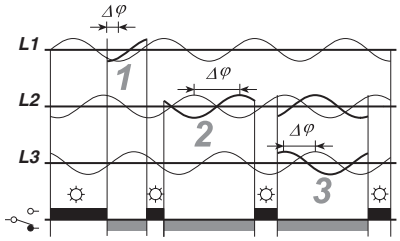
Mounting:
11-pole plug-in. S
DIN rail. D

Output relay:
SPDT. 1
DPDT[1]. 2

Measuring/supply voltage: [3]
3 x 220V AC 220
3 x 380V AC 380
3 x 400V AC 400
3 x 415V AC 415

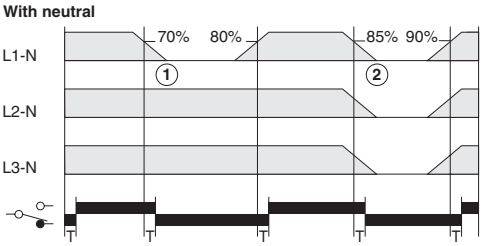
Options: [3]
Separate supply voltage:
220/240V AC ±10%. /S230

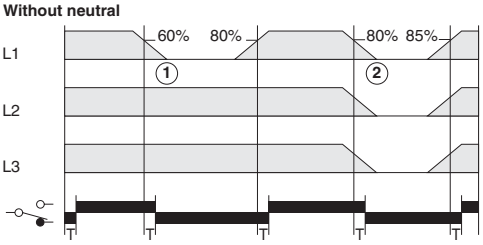
PHASE MONITORING



1. Lightly loaded 3-phase motor and L1 interrupted (φ > 20°).
2. Ohmic load or heavily loaded 3-phase motor and L2 interrupted (φ=180°).
3. Reversed order of the phases L2 and L3 i.e. incorrect phase sequence(φ=120°).

VOLTAGE MONITORING





1. Voltage drop on one phase.
2. Voltage drop on all 3 phases (symmetrical).

If one of the phases connected to an idle 3-phase motor is interrupted, no changes can be measured in the voltage and phase conditions, and the phase failure relay will not detect the failure.

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www.brodersencontrols.com
Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Phase measuring:
With neutral: Fault: φ > 25°, typically by φ > 20°.
Without neutral: Fault: φ > 50°, typically by φ > 40°.

Voltage measuring:
With neutral:
Change on 1 phase:
Energized output relay: > 90% of Vnom., typically by > 80%.
Fault: < 65% of Vnom., typically by < 70%.
Change of 3 phases, symm.:
Energized output relay: > 90% of Vnom.
Fault: < 80% of Vnom., typically by < 85%.
Without neutral:
Change on 1 phase:
Energized output relay: > 90% of Vnom., typically by > 80%.
Fault: < 50% of Vnom., typically by < 60%.
Change on 3 phases, symm.:
Energized output relay: > 90% of Vnom., typically by > 85%
Fault: < 75% of Vnom., typically by < 80%.

Temperature drift: All specifications apply for the specified temperature range.

Output relay: SPDT or DPDT.
Load (cosφ=1): D1/S1: 8A/240V AC
10mA/24V DC
S2: 5A/240V AC
10mA/24V DC
Frequency: Max. 1000 operations per hour at max. load.
Mechanical lifetime: Min. 10 x 10^6 operations.
Electrical lifetime: Min. 100.000 operations at full load.
Time delay: 0.3-0.9 sec.

Mounting: S1/S2: 11-pole plug in.
D1: Directly on 35 mm DIN rail (EN50022).

Terminals: Max. conductor size 4mm².
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply/measuring voltage:
3 x 220V AC + 10%,
3 x 380V AC + 10%,
3 x 400V AC + 10%,
3 x 415V AC + 10%.

220V AC ±10% (option S).
240V AC ±10% (option S).

Other AC voltages on request.

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

EMC: Conforming to EN 50081-1/EN 50082-2.

Isolation: 2kV AC according to EN 60950 class I.

Ambient temperature: -25 to 55°C.

Protection: S1/S2: IP40.

D1: IP20.

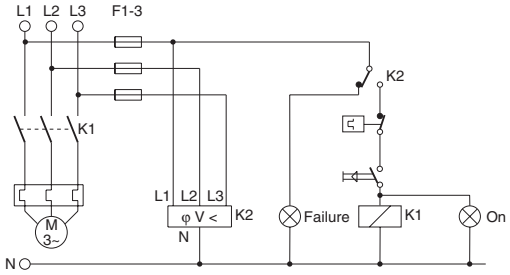
Housing: Noryl SE-1.

Weight: Typically 170 g.

NOTES/REMARKS

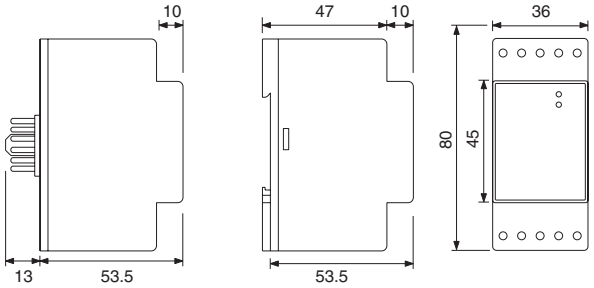
1) Double output relay only available in S2 version.
2) Terminal 2 (A1) is only used when a separate supply voltage is connected.
3) Available with user-specified voltage. Plese specify voltage.

APPLICATION

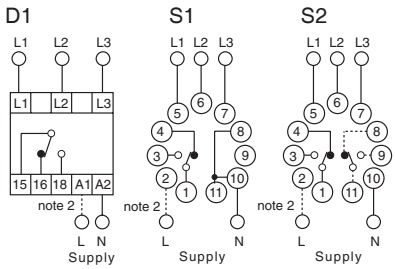


Monitoring of the supply voltage to a 3-phase motor with signal lamp indication of phase failure and motor contactor on.

MECHANICAL DIMENSIONS



WIRING DIAGRAMS



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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

DESCRIPTION

Digital control relay with 3½-digit LCD display.
The control relay is used for control and measurement of AC/DC voltage.
The actual input signal type and measuring range must be specified when the control relay is ordered.
3½ digit LCD display with selectable read-out of actual input and setpoint.
Output relay with LED indication of energized output relay.
Built-in power supply for direct mains supply. Galvanic isolation between input and supply.
Standardized housing for 11-pole plug-in or DIN rail mounting. Bases for DIN rail,surface and chassis mounting are listed under Accessories for MCP-10, see page 128.

VERSION/ORDERING CODES

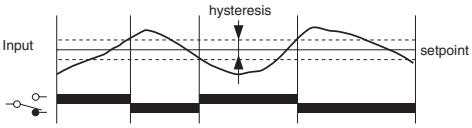
MCU-10 S 1 230 DV3

Type:	
Digital control relay.	MCU-10
Mounting:	
11-pole plug-in.	S
DIN rail.	D
Output relay:	
SPDT	1
Supply voltage:	
12-48V DC/10-30V AC	G24
12V AC/DC	912 1)
24V AC/DC	924 1)
24V AC	024
110/120V AC	115
220/240V AC	230
380/415V AC	400
Input:	
Voltage:	
DC:	
0-19.99V.	DV1
0-199.9V.	DV2
0-500V.	DV3
AC:	
0-19.99V.	AV1
0-199.9V.	AV2
0-500V.	AV3

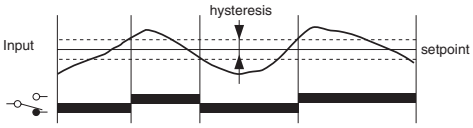
OPERATION

The display shows the actual input signal when the supply voltage is connected.
The setpoint is displayed by pressing the S button and the setpoint is adjusted on the front mounted potentiometer.
The output mode switch for selecting whether the output relay should be energized above or below the adjusted setpoint, see the diagrams below.
The red LED indicator will light up when the output relay is energized.

Mode 1: Output relay energized below setpoint

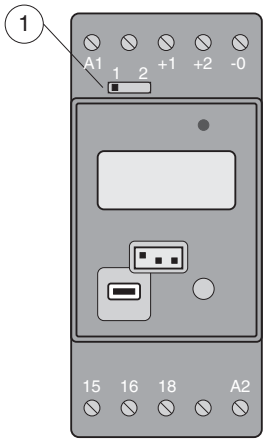


Mode 2: Output relay energized above setpoint

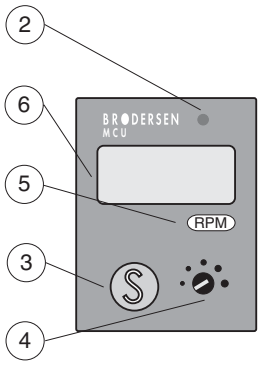


FRONT

Front



Front label



1. Output mode selector 2. LED indication of energized output relay 3. Button for setpoint read-out 4. Setpoint adjustment 5. Unit label position 6. Display field.

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Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Measuring ranges:

AC	DC
0-19.99V	0-19.99V
0-199.9V	0-199.9V
0-500V	0-500V

Input impedance:
AC.: 1kOhm/V.
DC: 1MOhm (>10V).

Measuring accuracy: 1% of full scale ± 1 digit.

Hysteresis: 1% of full range.

Temperature drift:
Voltage, current and temperature: Max. 0.01% per °C.

Display: 3½-digit LCD-type (-1999 to 1999).
Digit height: 6.5 mm.
Display update time: Typically 0.4 sec.

Scale: The scale is adjusted to the actual measuring range listed in the ordering key.

Output relay: SPDT (single changeover contact).
Load (cosφ=1): D1/S1: Max. 8A/240V AC
Min. 10mA/24VDC
Frequency: Max. 1000 operations per hour at max. load.
Mechanical life time: Min. 10 x 10^6 operations.
Electrical life time: Min. 100.000 operations at max. load.
Time delay: Typically 1s.

Mounting: S1: 11-pole plug-in.
D1: Directly on 35 mm DIN-rail (EN50022).

Terminals: Max. conductor size 4 mm^2.
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply voltage: 12-48VDC(10.5-60V)/12-30VAC.(10.5-35V).
12V AC/DC (10-18V) [1].
24V AC/DC (18-35V) [1].
24V AC (22-26V).
110/120V AC (95-135V).
220/240V AC (195-265V).
380/415V AC (342-418V).

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

Protection: S1: IP40.
D1: IP20.

EMC: Conforming to EN 50081-2/EN 50082-1.

Ambient temperature: -25-55°C.

Isolation:
AC versions: 4kV AC according to EN 60950 class II.
G24 version: 1kV AC

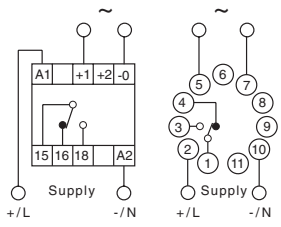
Dimensions: Identical to MCP-10, see page 38.

Housing: Black Noryl SE-1.

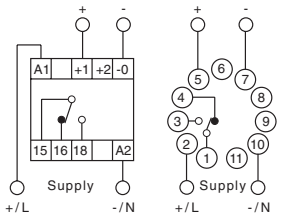
Weight: Typically 170 g.

WIRING DIAGRAMS

AC



DC



NOTES/REMARKS

1) There is no galvanic isolation between input and supply. External isolation should be provided to prevent damage to the controller when measuring voltage/current or a G- or other version with internal isolation should be used.

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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

DESCRIPTION

Digital control relay with 3½-digit LCD display.
The control relay is used for control and measurement of AC/DC current.
The actual input signal type and measuring range must be specified when the control relay is ordered.
3½ digit LCD display with selectable read-out of actual input and setpoint.
Output relay with LED indication of energized output relay.
Built-in power supply for direct mains supply. Galvanic isolation between input and supply.
Standardized housing for 11-pole plug-in or DIN rail mounting. Bases for DIN rail, surface and chassis mounting are listed under Accessories for MCP-10, see page128.

VERSION/ORDERING CODES

	MCU-10	S	1	230	DC1
Type:					
Digital control relay. MCU-10					
Mounting:					
11-pole plug-in. S		S			
DIN rail. D		D			
Output relay:					
SPDT 1			1		
Supply voltage:					
12-48VDC/10-30V AC G24				G24	
12V AC/DC 912 [1]				912	
24V AC/DC 924 [1]				924	
24V AC 024				024	
110/120V AC 115				115	
220/240V AC 230				230	
380/415V AC 400				400	
Input:					
Current:					
DC:					
0-19.99mA. DC1					DC1
0-199.9mA. DC2					DC2
0-10.00A. DC3 [2]					DC3
0-100.0A. DC4 [2]					DC4
AC:					
0-19.99mA. AC1					AC1
0-199.9mA. AC2					AC2
0-1.99A. AC3					AC3
0-199.9A. AC4 [3]					AC4
0-500A. AC5 [4]					AC5

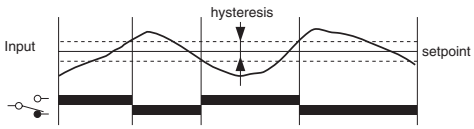
OPERATION

The display shows the actual input signal when the supply voltage is connected.

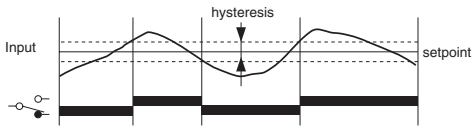
The setpoint is displayed by pressing the **S** button and the setpoint is adjusted on the front mounted potentiometer.

The output mode switch for selecting whether the output relay should be energized above or below the adjusted setpoint, see the diagrams below.
The red LED indicator will light up when the output relay is energized.

Mode 1: Output relay energized below setpoint

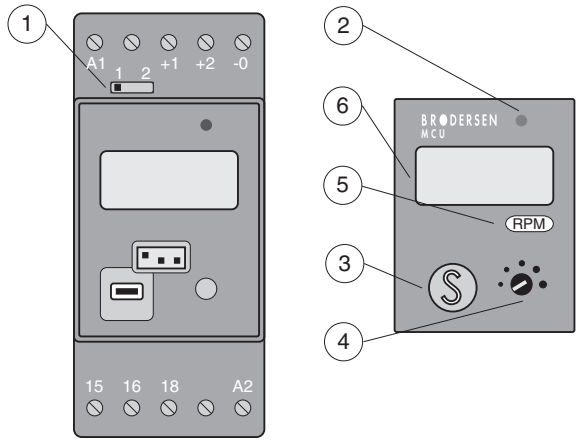


Mode 2: Output relay energized above setpoint



FRONT

Front **Front label**



1. Output mode selector 2. LED indication of energized output relay 3. Button for setpoint read-out 4. Setpoint adjustment 5. Unit label position 6. Display field.

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www.brodersencontrols.com
Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Measuring ranges:

AC		DC	
0-19.99mA		0-19.99mA	
0-199.9mA		0-199.9mA	
0-1.99A			
0-199.9A 0-500A	with external current transformer (1A sec.)	0-10.00A 0-100.0A	with external shunt (60mV voltage drop)

Input impedance: 1V
I max

.

60mV with shunt.
I max

Measuring accuracy: 1% of full scale ± 1 digit.

Hysteresis: 1% of full range.

Temperature drift:
Voltage, current and temperature: Max. 0.01% per °C.

Display: 3½-digit LCD-type (-1999 to 1999).
Digit height: 6.5 mm.
Display update time: Typically 0.4 sec.

Scale: The scale is adjusted to the actual measuring range listed in the ordering key.

Output relay: SPDT (single changeover contact).
Load (cosφ=1): D1/S1: Max. 8A/240V AC
Min. 10mA/24VDC
Frequency: Max. 1000 operations per hour at max. load.
Mechanical life time: Min. 10 x 10^6 operations.
Electrical life time: Min. 100.000 operations at max. load.
Time delay: Typically 1s.

Mounting: S1: 11-pole plug-in.
D1: Directly on 35 mm DIN-rail (EN50022).

Terminals: Max. conductor size 4 mm^2.
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply voltage: 12-48V DC(10.5-60V)/12-30V AC.(10.5-35V).
12V AC/DC (10-18V) [1].
24V AC/DC (18-35V) [1].
24V AC (22-26V).
110/120V AC (95-135V).
220/240V AC (195-265V).
380/415V AC (342-418V).

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

Protection: S1: IP40.
D1: IP20.

EMC: Conforming to EN 50081-2/EN 50082-1.

Ambient temperature: -25-55°C.

Isolation:
AC versions: 4kV AC according to EN 60950 class II.
G24 version: 1kV AC

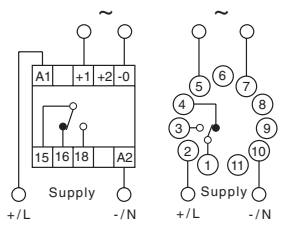
Dimensions: Identical with MCP-10, see page 39.

Housing: Black Noryl SE-1.

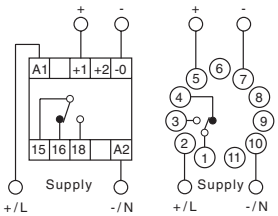
Weight: Typically 170 g

WIRING DIAGRAMS

AC



DC



NOTES/REMARKS

1) There is no galvanic isolation between input and supply. External isolation should be provided to prevent damage to the controller when measuring voltage/current or a G- or other version with internal isolation should be used.
2) With external shunt type AAS-010 (0-10.0 A DC) or type AAS-100 (0-100 A DC).
3) With external current transformer type AAT-200.1.
4) With external current transformer type AAT-500.1.

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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.c

DESCRIPTION

Digital control relay with 3½-digit LCD display.
The control relay is used for control and measurement of Temperature with Pt-100, Ni-100, and thermistors
The actual input signal type and measuring range must be specified when the control relay is ordered.
3½ digit LCD display with selectable read-out of actual input and setpoint.
Output relay with LED indication of energized output relay.
Built-in power supply for direct mains supply. Galvanic isolation between input and supply.
Standardized housing for 11-pole plug-in or DIN rail mounting. Bases for DIN rail,surface and chassis mounting are listed under Accessories for MCP-10, see page 128.

VERSION/ORDERING CODES

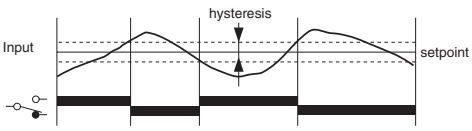
MCU-10 S 1 230 P1

Type:	
Digital control relay.	MCU-10
Mounting:	
11-pole plug-in.	S
DIN rail.	D
Output relay:	
SPDT	1
Supply voltage:	
12-48VDC/10-30V AC	G24
12V AC/DC	912 [1]
24V AC/DC	924 [1]
24V AC	024
110/120VAC	115
220/240V AC	230
380/415V AC	400
Input:	
RTDs:	
Pt-100:	
-50.0-199.9°C.	P1
-50-850°C.	P3
Ni-100:	
-50.0-199.9°C.	N1
Thermistor (KTY):	
-30.0-100.0°C.	T1

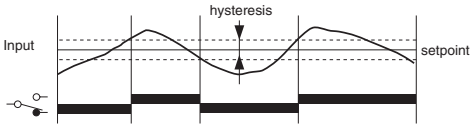
OPERATION

The display shows the actual input signal when the supply voltage is connected.
The setpoint is displayed by pressing the S button and the setpoint is adjusted on the front mounted potentiometer.
The output mode switch for selecting whether the output relay should be energized above or below the adjusted setpoint, see the diagrams below.
The red LED indicator will light up when the output relay is energized.

Mode 1: Output relay energized below setpoint

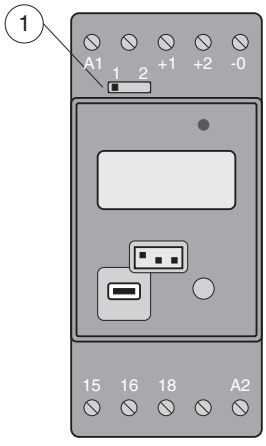


Mode 2: Output relay energized above setpoint

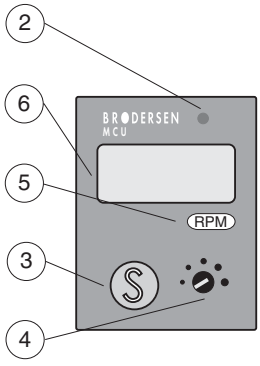


FRONT

Front



Front label



1 Output mode selector. 2 LED indication of energized output relay. 3 Button for setpoint read-out. 4 Setpoint adjustment. 5 Unit label position. 6 Display field.

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Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Measuring ranges:

RTDs/Thermistors		
Pt-100	Ni-100	Thermistor (KTY)
-50.0-199.9°C -50-850°C	-50.0-199.9°C	-30.0-100.0°C

Measuring accuracy: 1% of full scale ± 1 digit.

Hysteresis: 1% of full range.

Temperature drift: Max. 0.01% per °C.

Display: 3½-digit LCD-type (-1999 to 1999).
Digit height: 6.5 mm.
Display update time: Typically 0.4 sec.

Scale: The scale is adjusted to the actual measuring range listed in the ordering key, except U1 version with user adjustable scale (-1999 to 1999, max. 2000 steps).

Output relay: SPDT (single changeover contact).
Load (cosφ=1): D1/S1: Max. 8A/240V AC
Min. 10mA/24VDC
Frequency: Max. 1000 operations per hour at max. load.
Mechanical life time: Min. 10 x 10^6 operations.
Electrical life time: Min. 100.000 operations at max. load.
Time delay: Typically 1s.

Mounting: S1: 11-pole plug-in.
D1: Directly on 35 mm DIN-rail (EN50022).

Terminals: Max. conductor size 4 mm^2.
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply voltage: 12-48V DC (10.5-60V)/12-30V AC(10.5-35V).
12V AC/DC (10-18V) [1].
24V AC/DC (18-35V) [1].
24V AC (22-26V).
110/120V AC (95-135V).
220/240V AC (195-265V).
380/415V AC (342-418V).

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

Protection: S1: IP40.
D1: IP20.

EMC: Conforming to EN 50081-2/EN 50082-1.

Ambient temperature: -25-55°C.

Isolation:
AC versions: 4kV AC according to EN 60950 class II.
G24 version: 1kV AC

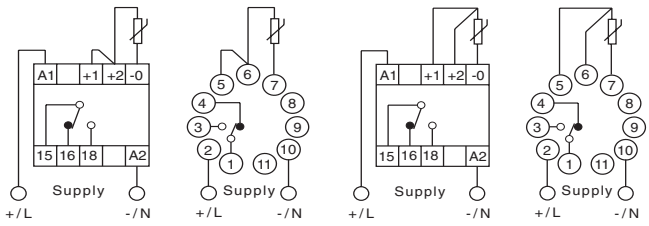
Dimensions: Identical to MCP-10, see page 38.

Housing: Black Noryl SE-1.

Weight: Typically 170 g.

WIRING DIAGRAMS

RTD/Thermistor (2-wire) RTD/Thermistor (3-wire)



The MCU-10 temperature controller is supported by a wide range of temperature sensors, see the temperature sensor data sheet for detailed technical information and ordering codes.

NOTES/REMARKS

1) There is no galvanic isolation between input and supply. External isolation should be provided to prevent damage to the controller when measuring voltage/current or a G- or other version with internal isolation should be used.

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Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

DESCRIPTION

Digital control relay with 3½-digit LCD display.
The control relay is used for control and measurement of temperature with thermocouples.
The actual input signal type must be specified when the control relay is ordered.
3½ digit LCD display with selectable read-out of actual input and setpoint.
Output relay with LED indication of energized output relay.
Built-in power supply for direct mains supply. Galvanic isolation between input and supply.
Standardized housing for 11-pole plug-in or DIN rail mounting. Bases for DIN rail,surface and chassis mounting are listed under Accessories for MCP-10, see page 128.

VERSION/ORDERING CODES

MCU-10 S 1 230 J1

Type:	
Digital control relay.	MCU-10
Mounting:	
11-pole plug-in.	S
DIN rail.	D
Output relay:	
SPDT	1
Supply voltage:	
12-48V DC/10-30V AC	G24
12V AC/DC	912 [1]
24V AC/DC	924 [1]
24V AC	024
110/120V AC	115
220/240V AC	230
380/415V AC	400
Input:	
Fe-CuN -50-1200°C.	J1 [2]
NiCr-Ni: -50-1350°C.	K1 [2]
PtRh-Pt 10%: -50-1750°C.	S1 [2]
PtRh-Pt 13%: -50-1750°C.	R1 [2]

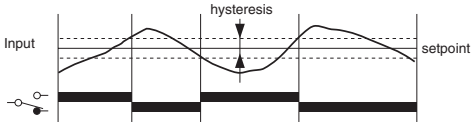
OPERATION

The display shows the actual input signal when the supply voltage is connected.

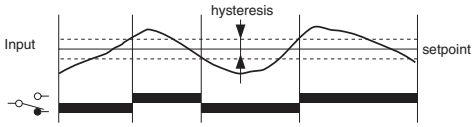
The setpoint is displayed by pressing the **S** button and the setpoint is adjusted on the front mounted potentiometer.

The output mode switch for selecting whether the output relay should be energized above or below the adjusted setpoint, see the diagrams below.
The red LED indicator will light up when the output relay is energized.

Mode 1: Output relay energized below setpoint

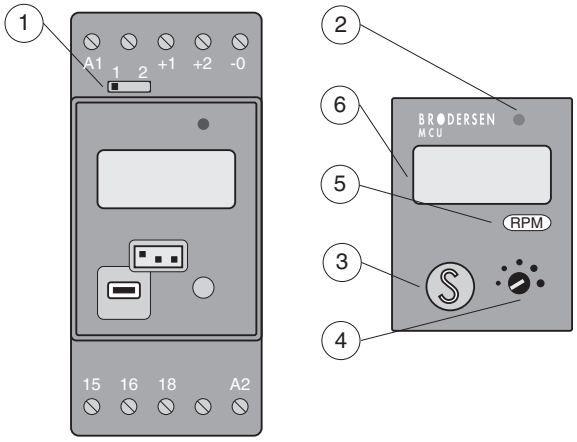


Mode 2: Output relay energized above setpoint



FRONT

Front **Front label**



1. Output mode selector 2. LED indication of energized output relay 3. Button for setpoint read-out 4. Setpoint adjustment 5. Unit label position 6. Display field.

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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Measuring ranges:

Thermocouples			
Fe-CuNi	NiCr-Ni	PtRh-Pt 10%	PtRh-Pt 13%
-50 -1200°C	-50 -1350°C	-50 -1750°C	-50 -1750°C

Measuring accuracy: 1% of full scale ± 1 digit [2].

Hysteresis: 1% of full range.

Temperature drift:
Voltage, current and temperature: Max. 0.01% per °C.
Standard process: Max. 0.02% per °C.

Display: 3½-digit LCD-type (-1999 to 1999).
Digit height: 6.5 mm.
Display update time: Typically 0.4 sec.

Output relay: SPDT (single changeover contact).
Load (cosφ=1): D1/S1: Max. 8A/240V AC
Min. 10mA/24VDC
Frequency: Max. 1000 operations per hour at max.load.
Mechanical life time: Min. 10 x 10^6 operations.
Electrical life time: Min. 100.000 operations at max. load.
Time delay: Typically 1s.

Mounting: S1: 11-pole plug-in.
D1: Directly on 35 mm DIN-rail (EN50022).

Terminals: Max. conductor size 4 mm^2.
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply voltage: 12-48V DC (10.5-60V)/12-30V AC(10.5-35V).
12V AC/DC (10-18V) [1].
24V AC/DC (18-35V) [1].
24V AC (22-26V).
110/120V AC (95-135V).
220/240V AC (195-265V).
380/415V AC (342-418V).

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

Protection: S1: IP40.
D1: IP20.

EMC: Conforming to EN 50081-1/EN 50082-2.

Ambient temperature: -25-55°C.

Isolation:
AC versions: 4kV AC according to EN 60950 class II.
G24 version: 1kV AC

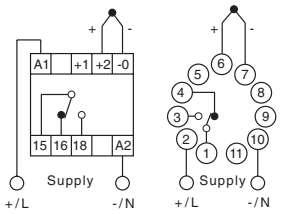
Dimensions: Identical to MCP-10, see page 38.

Housing: Black Noryl SE-1.

Weight: Typically 170 g.

WIRING DIAGRAMS

Thermocouple



The MCU-10 temperature controller is supported by a wide range of temperature sensors, see the temperature sensor data sheet for detailed technical information and ordering codes.

NOTES/REMARKS

1) There is no galvanic isolation between input and supply. External isolation should be provided to prevent damage to the controller when measuring voltage/current or a G- or other version with internal isolation should be used.
2) The specified accuracy is valid within the subranges:
J1: 0 -1100 °C. S1: 150 -1550 °C.
K1: 0 -1150 °C. R1: 150 -1550 °C.

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Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

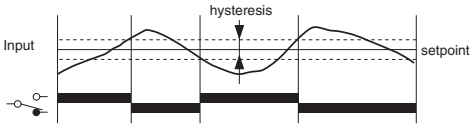
DESCRIPTION

Digital control relay with 3½-digit LCD display.
The scaling facilities of the MCU-10...U make it ideal as a monitor or control device for normal standard process signals, e.g. 4-20mA.
Any output from a transmitter can be scaled to engineering units and a unit label can be inserted on the front of the control relay. A sheet with common units is enclosed with the relay.
Typical applications:
General process instrumentation.
Signal monitor with read-out in engineering units.
3½ digit LCD display with selectable read-out of actual input and setpoint.
Output relay with LED indication of energized output relay.
Built-in power supply for direct mains supply. Galvanic isolation between input and supply.
Standardized housing for 11-pole plug-in or DIN rail mounting. Bases for DIN rail,surface and chassis mounting are listed under Accessories for MCP-10, see page 128.

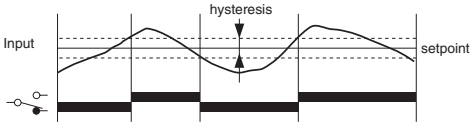
OPERATION

The display shows the actual input signal when the supply voltage is connected.
The setpoint is displayed by pressing the S button and the setpoint is adjusted on the front mounted potentiometer.
The output mode switch for selecting whether the output relay should be energized above or below the adjusted setpoint, see the diagrams below.
The red LED indicator will light up when the output relay is energized.

Mode 1: Output relay energized below setpoint



Mode 2: Output relay energized above setpoint



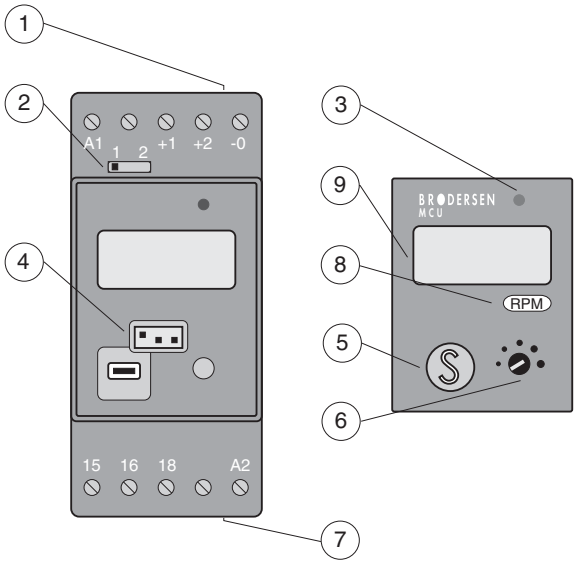
VERSION/ORDERING CODES

MCU-10 S 1 230 U1

Type:		
Digital control relay.	MCU-10	
Mounting:		
11-pole plug-in.	S	
DIN rail.	D	
Output relay:		
SPDT	1	
Supply voltage:		
12-48V DC/10-30V AC	G24	
12V AC/DC	912 [1)]	
24V AC/DC	924 [1)]	
24V AC	024	
110/120V AC	115	
220/240V AC	230	
380/415V AC	400	
Input:		
Standard process signals:		
0-20mA DC/4-20mA DC		
and 0-10V DC/2-10V DC	U1	

FRONT

Front **Front label**



1. Input selector 2. Output mode selector 3. LED indication of energized output relay 4. Decimal point position 5. Button for setpoint read-out 6. Setpoint adjustment 7. Scale and offset adjustment 8. Unit label position 9. Display field.

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Tel: +45 46 74 00 00
Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com

TECHNICAL DATA

Measuring ranges:

DC
0-20mA/4-20mA and 0-10V/2-10V. The actual input signal is selected via a switch on the control relay.

Measuring accuracy: 1% of full scale ± 1 digit.

Hysteresis: 1% of full range.

Input impedance:
Voltage: 1Mohm.
Current: 50Ohm.

Temperature drift: Max. 0.02% per °C.

Display: 3½-digit LCD-type (-1999 to 1999).
Digit height: 6.5 mm.
Display update time: Typically 0.4 sec.

Scale: The scale is adjusted to the actual measuring range which is user adjustable (-1999 to 1999, max. 2000 steps).

Decimal point: Selectable _.___ __.__ ___.__ ____

Output relay: SPDT (single changeover contact).
Load (cosφ=1): D1/S1: Max. 8A/240V AC
Min. 10mA/24VDC
Frequency: Max. 1000 operations per hour at max. load.
Mechanical life time: Min. 10 x 10^6 operations.
Electrical life time: Min. 100.000 operations at max. load.
Time delay: Typically 1s.

Mounting: S1: 11-pole plug-in.
D1: Directly on 35 mm DIN-rail (EN50022).

Terminals: Max. conductor size 4 mm^2.
Screw type terminals with self-lifting clamps shrouded in accordance with VDE0106 (finger and back of hand protection).

Supply voltage: 12-48VDC(10.5-60V)/12-30VAC(10.5-35V).
12V AC/DC (10-18V) [1].
24V AC/DC (18-35V) [1].
24V AC (22-26V).
110/120V AC (95-135V).
220/240V AC (195-265V).
380/415V AC (342-418V).

Mains frequency: 45-66Hz.

Consumption: 1-3VA.

Protection: S1: IP40.
D1: IP20.

EMC: Conforming to EN 50081-1/EN 50082-2.

Ambient temperature: -25-55°C.

Isolation:
AC versions: 4kV AC according to EN 60950 class II.
G24 version: 1kV AC

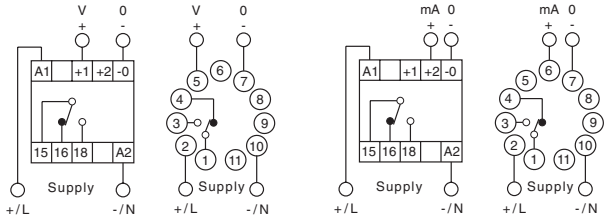
Dimensions: Identical to MCP-10, see page 39.

Housing: Black Noryl SE-1.

Weight: Typically 170 g.

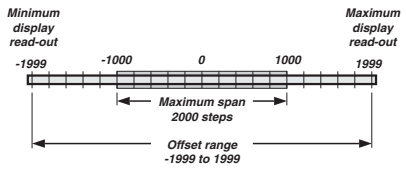
WIRING DIAGRAMS

Voltage Current



CONFIGURATION/CALIBRATION

The control relay for standard process signals is fully user adjustable within in the scale limits -1999 to 1999 with a maximum span of 2000 steps, e.g. a scale from -1000 to 1000.



The offset is adjustable within the range -1999 to 1999 ,however, the maximum offset must be smaller than the required span:
Max. offset≤Span = Max. scale - Min. scale
a scale e.g. 500 to 800 (500 ≤300 = 800 - 500) can therefore not be obtained.
Selectable decimal point position: _.___ __.__ ___.__ ____
Selectable input range:0-20mA/0-10V or 4-20mA/2-10V.
Example: Adjust the control relay to a scale -1000 to 1000, input signal 4-20mA.
1) Set the switches for input, output mode and decimal point position. Mount the front label and connect the supply voltage.
2) Apply min. signal 4mA and adjust Offset to display read-out 0000.
3) Apply max. signal 20mA and adjust Scale to a display read-out 1999. Adjust **Offset** to display read-out1000.
4) Apply min. signal 4mA and check display read-out is -1000. If incorrect, return to step 2 and readjust the control relay.

The control relay is now calibrated and ready to use.

NOTES/REMARKS

1) There is no galvanic isolation between input and supply. External isolation should be provided to prevent damage to the controller when measuring voltage/current or a G- or other version with internal isolation should be used.

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Fax: +45 46 75 73 36
E-mail: bc@brodersencontrols.com