

# SIPART DR Input/Output Modules

# 8



## 8/2 Overview: Input/output module applications

### 8/3 Analog signal modules

8/3	U/I module	6DR2800-8J
8/4	3 x U/I module	6DR2800-8A
8/5	R module	6DR2800-8R
8/6	Pt100 module	6DR2800-8P
8/7	TC module	6DR2800-8T
8/8	UNI module	6DR2800-8V
	Reference junction terminal	
	Measuring range connector	
8/10	y-hold module	6DR2802-8A

### 8/11 Analog and switching signal module

8/11	3AO/3DI module	6DR2802-8B
------	----------------	------------

### 8/12 Switching signal modules

8/12	5DI module	6DR2801-8C
8/13	2DO relay module	6DR2801-8D
8/14	4DO/2DI module	6DR2801-8E

### 8/15 Interface modules

8/15	SES module	6DR2803-8C
8/16	PROFIBUS DP module	6DR2803-8P

### 8/17 Coupling relay module

8/17	Coupling relay	6DR2804-8A/-8B
------	----------------	----------------

### 8/18 Ordering data



## Overview: Input/output module applications

Analog signal modules	SIPART DR19 Slot	SIPART DR20 <sup>1)</sup> Slot	SIPART DR21 Slot	SIPART DR22 Slot	SIPART DR24 Slot	Description see page
U/I module 6DR2800-8J	1/2	1/2	1/2	2/3	2/3	8/3
3 U/I modules 6DR2800-8A	-	-	-	5/6	5/6	8/4
R module 6DR2800-8R	1/2	1/2	1/2	2/3	2/3	8/5
Pt 100 module 6DR2800-8P	1/2	1/2	1/2	2/3	2/3	8/6
TC module 6DR2800-8T	1/2	1/2	1/2	2/3	2/3	8/7
UNI module 6DR2800-8V (TC/RTD/R/U/I)	1	-	1	2/3	2/3	8/8
y-hold module 6DR2802-8A	-	-	-	5/6	5/6	8/10
3AO/3DI module 6DR2802-8B	-	-	-	5/6	5/6	8/11

Switching signal modules	SIPART DR19 Slot	SIPART DR20 Slot	SIPART DR21 Slot	SIPART DR22 Slot	SIPART DR24 Slot	Description see page
5 DI 6DR2801-8C	3	-	3	5/6	5/6	8/12
2 relays 6DR2801-8D	3	GW	3	5/6	5/6	8/13
4DO/2DI 6DR2801-8E	3	GW	3	5/6	5/6	8/14

Interface module	SIPART DR19 Slot	SIPART DR20 Slot	SIPART DR21 Slot	SIPART DR22 Slot	SIPART DR24 Slot	Description see page
SES module 6DR2803-8C						8/15
RS 232/SIPART bus	4	4	4	4	4	
RS 485	4	-	4	-	-	
PROFIBUS DP module 6DR2803-8P	4	4	4	4	4	8/16

<b>Coupling relay module</b> can be installed on rear of following controllers	SIPART DR19	SIPART DR20	SIPART DR21	SIPART DR22	SIPART DR24	Description see page
with 4 relays 6DR2804-8A	Yes	-	Yes	Yes	Yes	8/17
with 2 relays 6DR2804-8B	Yes	-	Yes	Yes	Yes	8/17

Depending on the application, the following can be used in conjunction with the UNI module 6DR2800-8V and SIPART DR19/AE1	Description see page
Reference junction terminal 6DR2805-8A	8/8
Measuring range connector 6DR2805-8J	8/8

<sup>1)</sup> The SIPART DR20 controller has been discontinued.

## Analog signal modules

- U/I module 6DR2800-8J for current and voltage input

This input/output module enables a current or voltage signal to be connected. The module is used to extend the number of analog inputs and provides electronic isolation through a differential amplifier with high common mode rejection.

The changeover between current and voltage input is handled by coding jumpers on the module itself. In addition, the wiring of the connector is different.

The signal range 0 to 20 mA, 4 to 20 mA, 0 to 1 V, 0.2 to 1 V, 0 to 10 V or 2 to 10 V as well as the assignment to the function inputs is determined when the controller is configured.

The input impedance is 49.9  $\Omega$  if the module is being used as a current input. Owing to the high common mode rejection, several inputs or another consumer can be connected in series.

The input impedance is 200 k $\Omega$  if the module is being used as a voltage input.

The screw-type terminal is part of the scope of supply.

Technical data 6DR2800-8J		
U/I module	Current	Voltage
Start of measuring range	0 or 4 mA	0 or 0.2 V or 2 V
End of measuring range	20 mA	1 V or 10 V
Output range	-0.8 to 23 mA	-4 % to 115 %
Input impedance		
- difference	49.9 $\Omega$ $\pm$ 0.1 %	200 k $\Omega$
- common mode	500 k $\Omega$	$\geq$ 200 k $\Omega$
Permitted common mode voltage (rated range)	0 to +10 V	0 to +10 V
Filter time constant $\pm$ 20 %	50 ms	
Error without A/D conversion		
- zero	$\leq$ 0.3 %	$\leq$ 0.2 %
- gain	$\leq$ 0.5 %	$\leq$ 0.2 %
- linearity	$\leq$ 0.05 %	$\leq$ 0.05 %
- common mode	$\leq$ 0.07 %/V	$\leq$ 0.02 %/V
Variation with temperature without A/D conversion		
- zero	$\leq$ 0.05 %/10 K	$\leq$ 0.02 %/10 K
- gain	$\leq$ 0.1 %/10 K	$\leq$ 0.1 %/10 K

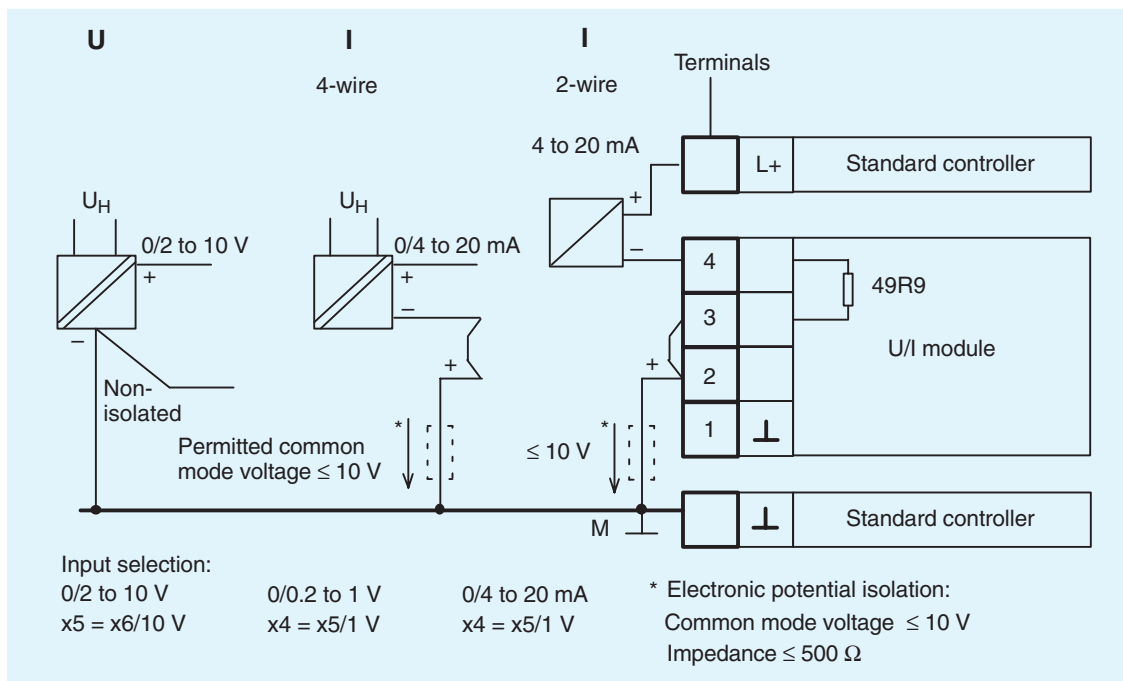


Fig. 8/1 Wiring of U/I module 6DR2800-8J

# SIPART DR Input/Output Modules

## Analog signal modules

- Three 6DR2800-8A U/I modules for current and voltage input

This input/output module has 3 channels (inputs) for connecting current or voltage signals. The module is used to extend the number of analog inputs in the SIPART DR22 controller or in the SIPART DR24 multi-function unit and provides electronic isolation through a differential amplifier with high common mode rejection.

The changeover between current and voltage input is handled by coding jumpers on the module itself. In addition, the wiring of the connector is different.

The signal range 0 to 20 mA, 4 to 20 mA, 0 to 1 V, 0.2 to 1 V, 0 to 10 V or 2 to 10 V as well as the assignment to the function inputs is determined when the controller is configured.

The input impedance is 49.9  $\Omega$  if the module is being used as a current input. Owing to the high common mode rejection, several inputs or another consumer can be connected in series.

The input impedance is 200 k $\Omega$  if the module is being used as a voltage input.

The screw-type terminal is part of the scope of supply.

Technical data 6DR2800-8A		
Three U/I modules	Current	Voltage
Start of measuring range	0 or 4 mA	0 or 0.2 V or 2 V
End of measuring range	20 mA	1 V or 10 V
Output range	-0.8 to 23 mA	-4 % to 115 %
Input impedance		
- difference	49.9 $\Omega$ $\pm$ 0.1 %	200 k $\Omega$
- common mode	500 k $\Omega$	$\geq$ 200 k $\Omega$
Permitted common mode voltage (rated range)	0 to +10 V	0 to +10 V
Filter time constant $\pm$ 20 %	50 ms	
Error without A/D conversion		
- zero	$\leq$ 0.3 %	$\leq$ 0.2 %
- gain	$\leq$ 0.5 %	$\leq$ 0.2 %
- linearity	$\leq$ 0.05 %	$\leq$ 0.05 %
- common mode	$\leq$ 0.07 %/V	$\leq$ 0.02 %/V
Variation with temperature without A/D conversion		
- zero gain	$\leq$ 0.05 %/10 K	$\leq$ 0.02 %/10 K
- gain	$\leq$ 0.1 %/10 K	$\leq$ 0.1 %/10 K

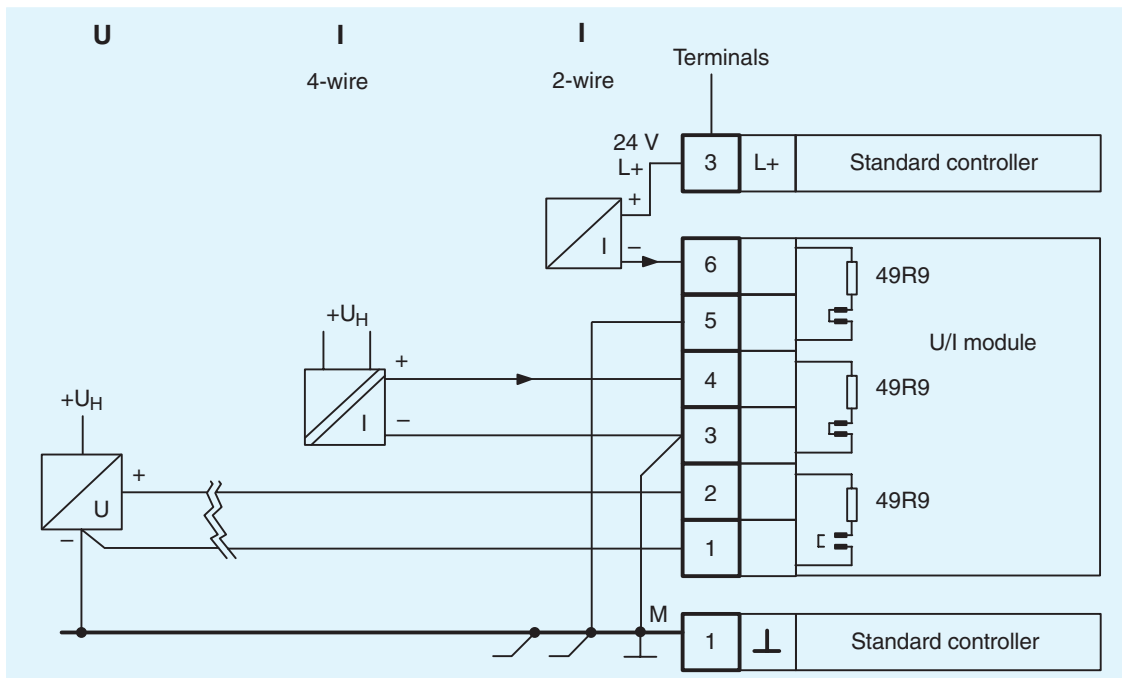


Fig. 8/2 Three U/I modules 6DR2800-8A

## Analog signal modules

- R module 6DR2800-8R for resistance input (potentiometer)

This input/output module allows a potentiometer with a rated resistance of between 80 and 1200 Ω to be connected. The signal range (80 to 220 Ω, 200 to 500 Ω or 470 to 1200 Ω) is selected using jumpers on the module.

Trimming of the start of scale and full scale values is performed once the module is inserted using a potentiometer on the rear of the module.

The assignment to the function inputs is determined when the controller is configured.

This module can also be configured as a current input. It is best used when the start of scale and full scale values of the current signal do not exactly match the standard signal ranges and need to be trimmed. The input impedance is 49.9 Ω in this case.

The input is not isolated.

The screw-type terminal is part of the scope of supply.

### Technical data 6DR2800-8R

#### R module

Start of measuring range - span, min. - max. zero suppression - end	0 Ω $\Delta R \geq 0.3 \cdot R$ $R_A \leq 0.2 \cdot R$ $R_A + 1.1 \cdot R$ R in 3 spans 200 - 500 - 1000 Ω adjustable
Output range	-5 % to 105 %
Supply current Line resistors $R_i$ - two-wire circuit - three-wire circuit - four-wire circuit	5 mA ± 5 % - < 10 Ω each -
Filter time constants ± 20 %	50 ms
Error without A/D conversion - zero - gain - linearity	≤ 0.2 % ≤ 0.2 % ≤ 0.2 %
Variation with temperature without A/D conversion - zero - gain	≤ 0.1 %/10 K ≤ 0.3 %/10 K

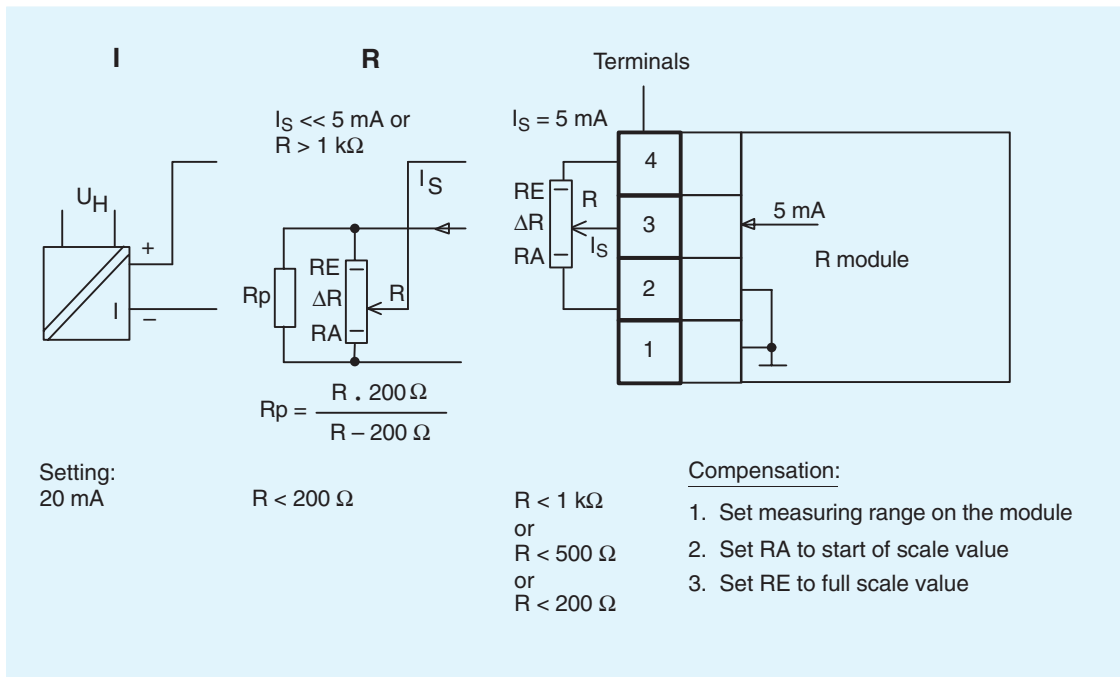


Fig. 8/3 Wiring of R module 6DR2800-8R

## Analog signal modules

- Pt100 module 6DR2800-8P for Pt100 resistance thermometers

Via this input/output module, a Pt100 resistance thermometer (RTD) can be connected.

### Note:

The type of connection, two-wire, three-wire or four-wire, and the start of scale and full scale values are selected using jumpers on the module. The jumper settings can be found in the SIPART DR20 manual.

Trimming of the start of scale and full scale values is performed once the module is inserted using a potentiometer on the rear of the module.

The output signal is temperature linear.

The screw-type terminal is part of the scope of supply.

Technical data 6DR2800-8P	
<b>Pt100 module</b>	
Start of measuring range	$R_{tA} \geq 80.25 \Omega$ ( $t_A \geq -50 \text{ }^\circ\text{C}$ )
- span, min.	$\Delta R = 19 \Omega$ ( $\Delta t = 50 \text{ }^\circ\text{C}$ )
- max. zero suppression	$R_{tA} \leq 5 \cdot \Delta R$
- end	$R_{tE} \leq 390.26 \Omega$ ( $t_E \leq 850 \text{ }^\circ\text{C}$ )
Supply current	$100 \text{ mV}/\Delta R$
Line resistors $R_L$	
- two-wire circuit	$R_{L1} + R_{L2} \leq 10 \Omega$
- three-wire circuit	$R_{L1} = R_{L2} = R_{L3} \leq 50 \Omega$
- four-wire circuit	$R_L \leq 80 \Omega$
Filter time constants $\pm 20 \%$	50 ms
Error without A/D conversion	
- zero	$\leq 0.1 \%$
- gain	$\leq 0.1 \%$
- linearity	$\leq 0.3 \%$
Variation with temperature without A/D conversion	
- zero	$\leq 0.2 \%/10 \text{ K}$
- gain	$\leq 0.3 \%/10 \text{ K}$

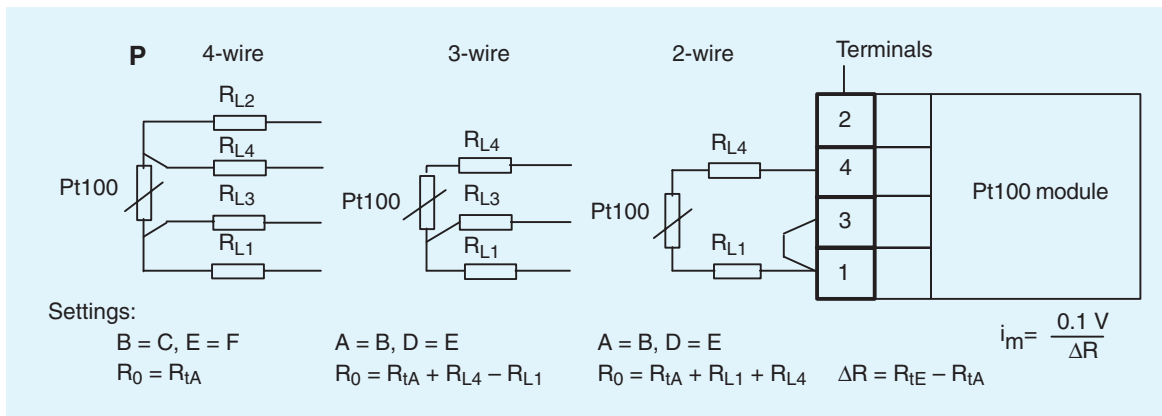


Fig. 8/4 Wiring of Pt 100 module 6DR2800-8P

## Analog signal modules

- TC module 6DR2800-8T for thermocouples or other mV signals

A thermocouple or other voltage source can be connected directly using the TC module.

Reference junction compensation can take place either internally or externally. Internal compensation is implemented through a temperature sensor (included with the TC module) mounted on the terminal block.

The type of thermocouple, reference junction compensation method, start of scale and span, plus the response in the event of a sensor break (output goes high or low) are all determined using jumpers on the module.

The input/output module works on voltage linear principles and can be used for all thermoelectric e.m.f. or mV signals. Linearization must be performed using the lineariser in the standard controller if thermocouples are connected.

### Note:

The jumper settings can be found in the SIPART DR20 manual.

Trimming of the start of scale and full values is performed once the module is inserted using a potentiometer on the rear of the module.

The following thermocouple pairs can be connected:

according to DIN IEC 584, Part 1

- Cu-CuNi (Type T)
- Fe-CuNi (Type J)
- NiCr-Ni (Type K)
- NiCr-CuNi (Type E)
- Pt10Rh-Pt (Type S)
- Pt13Rh-Pt (Type R)
- Pt30Rh-Pt6Rh (Type B)

according to DIN 43 710

- Cu-CuNi (Type U)
- Fe-CuNi (Type L)

This input/output module is electronically isolated.

The screw-type terminal is part of the scope of supply.

Technical data 6DR2800-8T	
<b>TC module</b>	
Start of measuring range - span, min. - max. zero suppression - end Output range	-5 · ΔU ... 0 ... +5 · ΔU ΔU = 10 mV  U  ≤ 5 · ΔU U ≤ 60 mV -5 to 105 %
Input impedance - difference - common mode Permitted common mode voltage (rated range) Line resistances	2 MΩ 1 MΩ -10 to +10 V $R_{L1} + R_{L2} \leq 300 \Omega$
Filter time constant ± 20 %	20 ms
Error without A/D conversion - zero - gain - linearity - common mode - reference junction compensation	≤ 0.1 % ≤ 0.1 % ≤ 0.1 % ≤ 0.1 %/V ≤ 2 °C
Variation with temperature without A/D conversion - zero - gain - reference junction compensation	≤ 0.3 %/10 K ≤ 0.3 %/10 K ≤ 0.5 %/10 K

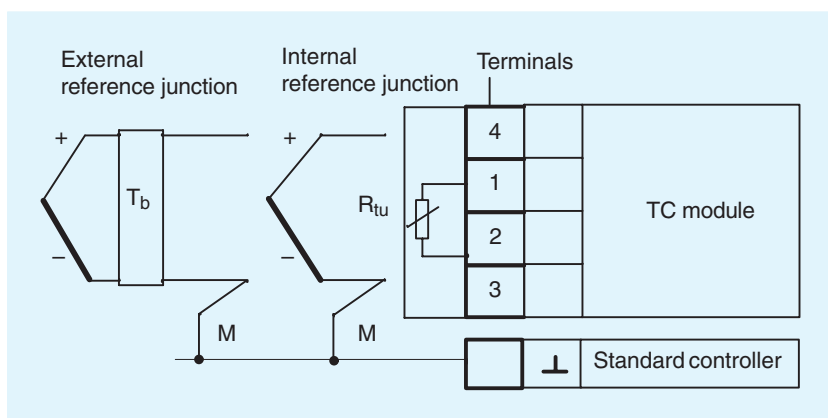


Fig. 8/5 Wiring of TC module 6DR2800-8T

## Analog signal modules

- UNI module 6DR2800-8V for connecting
  - Pt100 resistance thermometers (RTD)
  - Thermocouples (TC)
  - mV sources
  - Potentiometers (R)
  - U/I input (10 V/20 mA)
- Reference junction terminal 6DR2805-8A
- Measuring range connector 6DR2805-8J

This input/output module has galvanic isolation.

The following sensors can be connected.

- Pt100 resistance thermometers in 2-, 3- or 4-wire circuits
- Thermocouples with internal (reference junction terminal 6DR2805-8A required) or external reference junction
- mV signals
- Resistance based sensor (potentiometer) in 2-wire circuit
- 10 V and 20 mA signals via an additional measuring range connector (6DR2805-8J)

The module is designed for use with the SIPART DR19/21/22 and SIPART DR24 controllers. The module is configured and set up in the configuring level StrS (configuring switches) and CAE (calibrate analog input) of these controllers. No settings need be made on the module itself.

The screw-type terminal is part of the scope of supply.

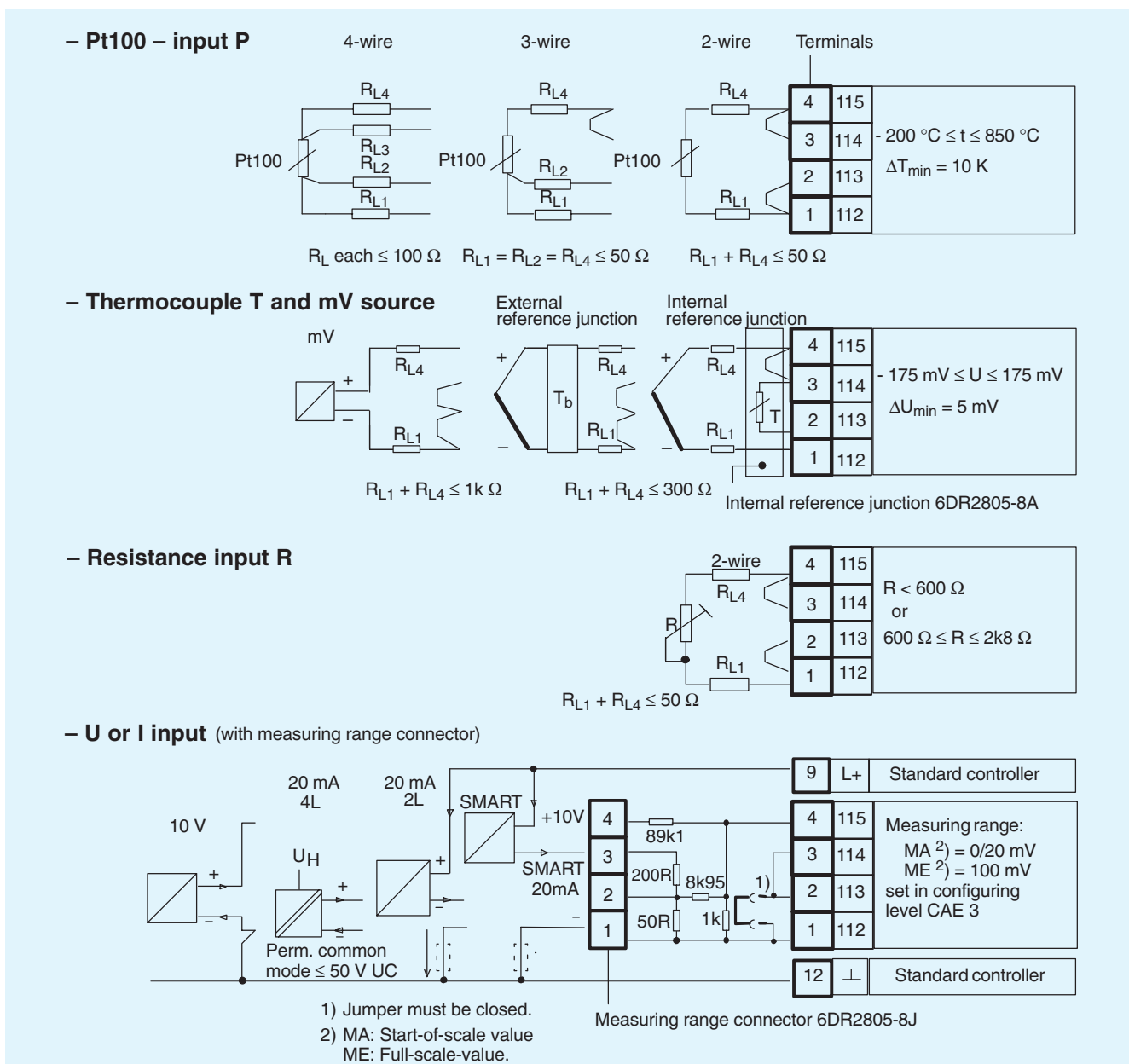


Fig. 8/6 Wiring of UNI module 6DR2800-8V



## Analog signal modules

Technical data 6DR2800-8V	
<b>Pt 100 resistance thermometer</b>	
Line resistance - 2-wire circuit	Line resistance configurable $R_{Ab} = R_{L1} + R_{L4}$ , or automatic calibration when configuring $R_{L1} + R_{L4} \leq 50 \Omega$ No compensation necessary when $R_{L1} = R_{L2} = R_{L4}$ $R_{L1}, R_{L2}, R_{L4} \leq 50 \Omega$ $R_{L1}$ to $R_{L4} \leq 100 \Omega$
- 3-wire circuit	
- 4-wire circuit	
Measuring current	400 $\mu$ A
Measuring range, configurable start end Recommended min. span	MA $\geq -200$ °C ME $\leq +850$ °C 10 K
Characteristic Filter time constant Potential isolation permitted common mode voltage Test voltage	Temperature linear < 2 s adaptive $\leq 50$ V AC/DC 500 V AC

Thermocouples		
Thermocouples, configurable according to DIN IEC 584 Part 1	Cu-CuNi Fe-CuNi NiCr-Ni NiCr-CuNi Pt10Rh-Pt Pt13Rh-Pt Pt30Rh-Pt6Rh NiCrSi-NiSi	Type T J K E S R B N
according to DIN 43 710	Cu-CuNi Fe-CuNi	U L
Reference junction compensation internal external	Reference junction terminal required Temperature of the external reference junction configurable	
Line resistance	$\leq 300 \Omega$	
Measuring range, configurable start end Recommended min. span	$\geq -175$ mV $\leq +175$ mV 5 mV	
Characteristic, configurable	Voltage or temperature linear	
Filter time constant Input current Potential isolation permitted common mode voltage test voltage Stat. destruction limit across inputs	< 2 s adaptive $\leq 1 \mu$ A $\leq 50$ V AC/DC 500 V AC $\pm 35$ V	

mV source	
Measuring range, configurable start end Recommended min. span	$\geq -175$ mV $\leq +175$ mV 5 mV
Line resistance	$\leq 1$ k $\Omega$
Characteristic Input current Potential isolation permitted common mode voltage test voltage Stat. destruction limit across inputs	Voltage linear $\leq 1 \mu$ A $\leq 50$ V AC/DC 500 V AC $\pm 35$ V

Resistance based sensor R		
Measuring range, configurable Measuring range limits incl. line resistance	Measuring range	
	$R_{tot} \leq 600 \Omega$	$600 \Omega \leq R_{tot} \leq 2.8$ k $\Omega$
Recommended min. span. Input current Linearity error	30 $\Omega$ 290 $\mu$ A $\pm 60$ m $\Omega$	70 $\Omega$ 60 $\mu$ A $\pm 0.2 \Omega$

mA source	
with additional measuring range connector 6DR2805-8J	
Measuring range, can be compensated start end	0/4 mA $\triangleq$ 0/20 mV 20 mA $\triangleq$ 100 mV
Transformation error Input resistance Smart input resistance Potential isolation permitted common mode voltage Stat. destruction limit across inputs	0.3 % 50 $\Omega$ 250 $\Omega$ $\leq 50$ V AC/DC $\pm 40$ mA

10 V-voltage source	
with additional measuring range connector 6DR2805-8J	
Measuring range, can be compensated start end	0/2 V $\triangleq$ 0/20 mV 10 V $\triangleq$ 100 mV
Transformation error Input resistance Potential isolation permitted common mode voltage Stat. destruction limit across inputs	0.2 % 90 k $\Omega$ $\leq 50$ V AC/DC $\pm 100$ V

## Analog signal modules

- y-hold module 6DR2802-8A  
analog output module with alarm output

The y-hold module is designed for use with the SIPART DR22 and SIPART DR24 controllers. It has a 0/4 to 20 mA analog output and a digital output for the CPU alarm signal ( $\overline{St}$  = High). When used with the SIPART DR22 controller, the analog output is permanently assigned the manipulated variable  $y$ .

The module contains a microprocessor that transfers data in serial mode to and from the processor in the controller. If the transfer of data is interrupted, the analog output retains the last manipulated variable and the CPU alarm output is triggered ( $\overline{St}$  = Low).

The module can be powered via an external supply, which is ORed with the internal supply on the module. This enables the manipulated variable  $y$  to be retained if:

- the controller's power supply fails
- the y-hold module is removed and the controller replaced.

The screw-type terminal is supplied with the module.

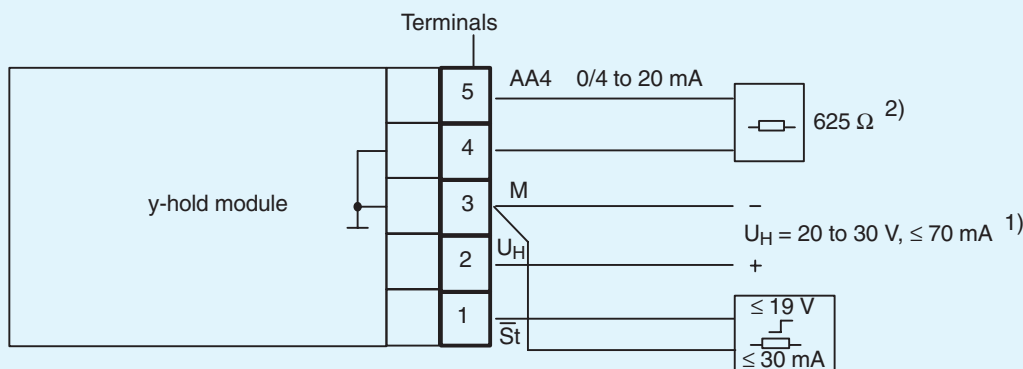
### Technical data 6DR2802-8A

#### y-hold module

Analog output	
Rated signal range	0 to 20 mA or 4 to 20 mA
Load voltage	
- Supplied from controller	-1 to +18 V
- External supply ( $U_H > 22.5$ V)	-1 to +15 V
Max. permitted inductivity	$\leq 0.1$ H

Digital output $\overline{St}$	
Signal status 0	$\leq 1.5$ V
Signal status 1	+19 to 26 V
On-load current	$\leq 30$ mA
Short-circuit current	$\leq 50$ mA pulsed

Power supply $U_H$	
- Voltage range	20 to 30 V
- Power consumption of $U_H$ when on external supply when supplied from controller	$\leq 70$ mA Approx. 6 mA



- 1)  $U_H$  need only be connected if the output current has to be retained should the power supply to the multi-function unit fail or the module is removed when servicing.
- 2) Up to 900  $\Omega$  possible, depending on the power supply.

Fig. 8/7 y-hold module 6DR2802-8A

## Analog and switching signal module

- 3AO/3DI module 6DR2802-8B for the extension of the analog outputs and the digital inputs

The 3AO/3DI module is suitable for use in the SIPART DR22 and DR24 controllers.

Assignment of functions and the logic is performed using the controllers adjustments.

The screw-type terminal is supplied with the module.

### Technical data 6DR2802-8B

#### 3AO/3DI module

Analog outputs	
Rated signal range (0 to 100 %)	0 to 20 mA or 4 to 20 mA
Output range	0 to 20.5 mA or 3.8 to 20.5 mA
Load voltage	from -1 V to 18 V
No-load voltage	≤ 26 V
Inductive load	≤ 0.1 H
Time constant	10 ms
Residual ripple 900 Hz	≤ 0.2 %
Resolution	10 bits
Load dependence	≤ 0.1 %
Zero error	≤ 0.3 %
Final value error	≤ 0.3 %
Linearity	≤ 0.05 %

Digital inputs	
Signal status "0"	≤ 4.5 V or open
Signal status "1"	≥ 13 V
Input resistance	≥ 27 kΩ
Static destruction limit across inputs	± 35 V

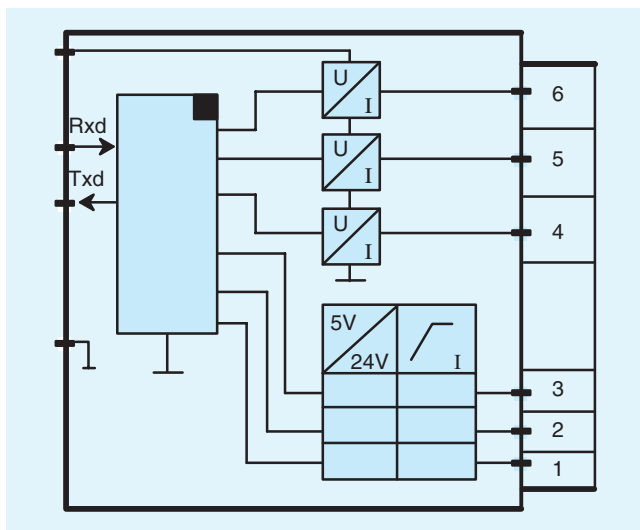


Fig. 8/8 Wiring of 3AO/3DI module

### Assignment of the terminals to the analog outputs (AO) and the digital inputs (DI); depending on slot

Terminal	SIPART DR22 and DR24	
	Analog outputs	
	Slot 5	Slot 6
6	AA9	AA6
5	AA8	AA5
4	AA7	AA4
Terminal	Digital inputs	
	Slot 5	Slot 6
	3	BE7
2	BE6	BE11
1	BE5	BE10

# SIPART DR Input/Output Modules

## Switching signal modules

- 5DI module 6DR2801-8C for additional digital inputs

Module with 5 digital inputs.

Assignment of functions and the logic is performed using the configuring switches.

The screw-type terminal is supplied with the module.

Technical data 6DR2801-8C	
<b>5DI module</b>	
Signal status "0"	≤ 4.5 V or open
Signal status "1"	≥ 13 V
Input resistance	≥ 27 kΩ
Static destruction limit across inputs	± 35 V

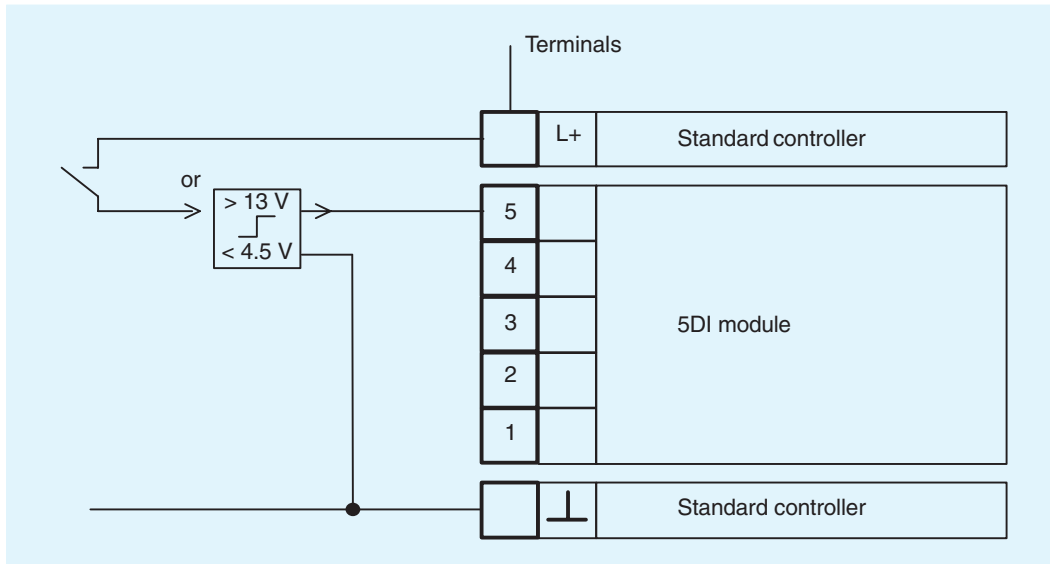


Fig. 8/9 Wiring of 5DI module 6DR2801-8C

# 8

## Assignment of the terminals to the digital input (DI); depending on device version and slot

Terminal	Digital input with:		
	SIPART DR19 and DR21	SIPART DR22 and DR24	
		Slot 5	Slot 6
5	BE7	BE9	BE14
4	BE6	BE8	BE13
3	BE5	BE7	BE12
2	BE4	BE6	BE11
1	BE3	BE5	BE10

## Switching signal modules

- 2DO relay module 6DR2801-8D for additional digital outputs

Relay output module for 2 digital outputs.  
Floating changeover contact, can take up to 35 V.

Assignment of functions and the logic is performed using the configuring switches.

The RC networks of the spark suppressors all lie parallel to the NC and NO contact. The current flowing via the spark suppressor capacitor (1  $\mu$ F) when the contact is open (e. g. contactor withstand current) can cause interference in the case of AC consumers with a very low rating. Should this happen, the capacitors should be replaced by ones with a lower rating or be removed altogether.

The 68 V suppressor diodes connected in parallel to the contacts also have an effect and limit the induced voltage.

The screw-type terminal is supplied with the module.

Technical data 6DR2801-8D		
<b>2DO relay module</b>		
Contact material	Ag/Ni	
Contact rating	AC	DC
Max. switching voltage	$\leq 35$ V	$\leq 35$ V
Max. switching current	$\leq 5$ A	$\leq 5$ A
Max. switching capacity	$\leq 150$ VA	$\leq 100$ W at 24 V $\leq 80$ W at 30 V
Service life	2 · 10 <sup>7</sup> switching operations 2 · 10 <sup>6</sup> switching operations 2 · 10 <sup>5</sup> switching operations	
Spark suppressor	1 $\mu$ F and 22 $\Omega$ connected in series, with 68 V suppressor diodes wired in parallel	

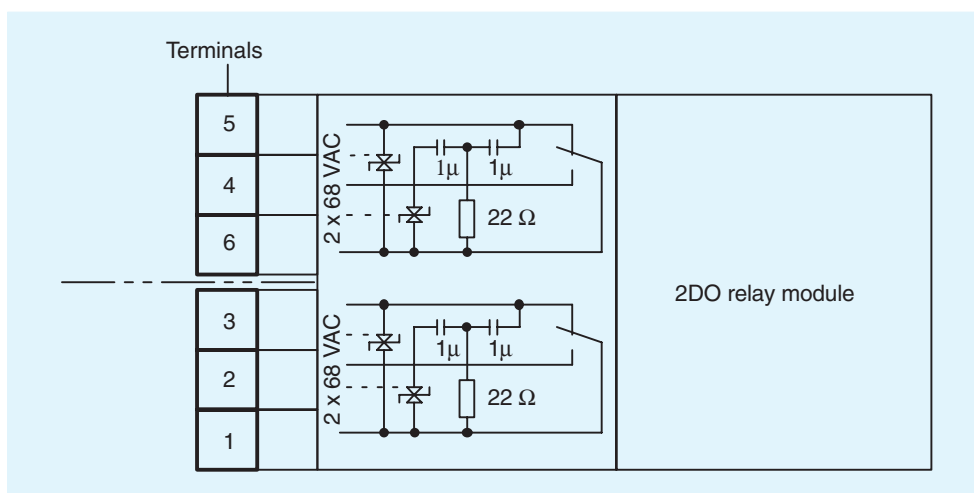


Fig. 8/10 Wiring of 2DO relay module 6DR2801-8D

### Assignment of the terminals to the digital output (DO); depending on device version and slot

Terminals	Relay output with:			
	SIPART DR19 and DR21	SIPART DR20	SIPART DR22 and DR24	
			Slot 5	Slot 6
4, 5, 6	BA4	A1	BA10	BA14
1, 2, 3	BA3	A2	BA9	BA13

## Switching signal modules

- 4DO/2DI module 6DR2801-8E for additional digital inputs and outputs

Module with 2 digital inputs and 4 active digital outputs.

Assignment of functions and the logic is performed using the configuring switches.

The screw-type terminal is supplied with the module.

With the SIPART DR22 and DR24 devices, the digital input on terminal 6 cannot be used.

### Technical data 6DR2801-8E

#### 4DO/2DI module

Digital inputs	
Signal status "0"	$\leq 4.5 \text{ V}$ or open
Signal status "1"	$\geq 13 \text{ V}$
Input resistance	$\geq 27 \text{ k}\Omega$
Static destruction limit across inputs	$\pm 35 \text{ V}$
Digital outputs	
Signal status "0"	$\leq 1.5 \text{ V}$
Signal status "1"	19 to 26 V
On-load current	$\leq 30 \text{ mA}$
Short-circuit current	$\leq 50 \text{ mA}$ , pulsed
Static destruction limit across inputs	-1 V or +35 V

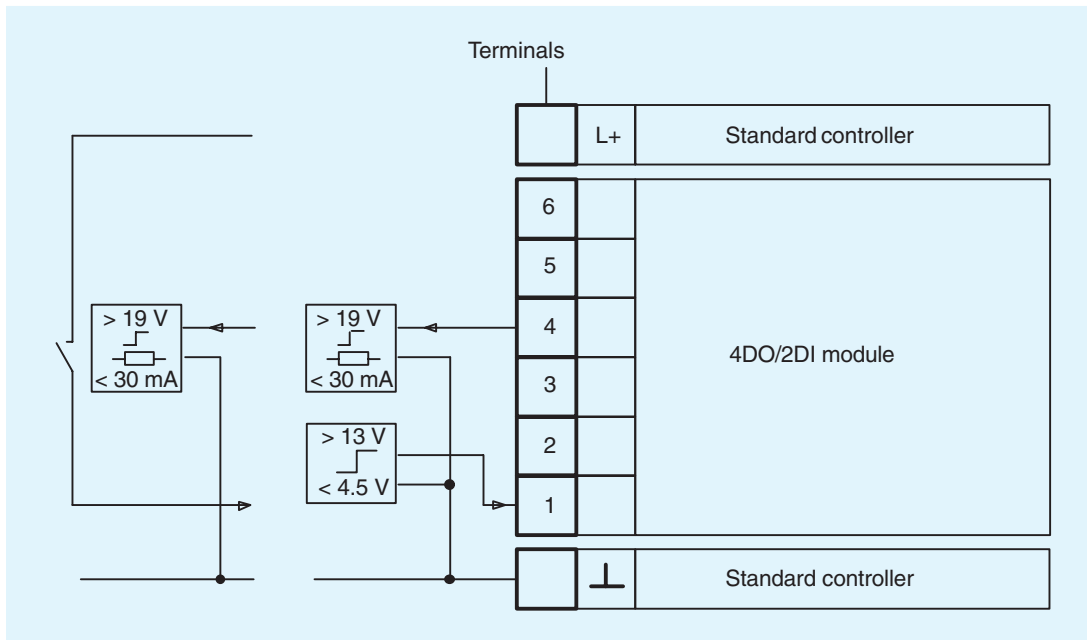


Fig. 8/11 Wiring of 4DO/2DI module 6DR2801-8E

### Assignment of the terminals to the digital input (DI) and the digital output (DO); depending on device version and slot

Terminal	Digital input, digital output with:			
	SIPART DR19 and DR21	SIPART DR20	SIPART DR22 and DR24	
			Slot 5	Slot 6
6	BE4	-	-	-
5	BA6	+Δy	BA12	BA16
4	BA5	-Δy	BA11	BA15
3	BA4	A2	BA10	BA14
2	BA3	A1	BA9	BA13
1	BE3	BLPS <sup>1)</sup>	BE5	BE10

<sup>1)</sup> BLPS = Blocking, parameterization and configuring.

## Interface modules

- SES module 6DR2803-8C  
Serial interface module for RS 232 and RS 485

All process variables, status flags, setpoints, manipulated variables, parameters and configuring switch settings can be transmitted and received via the serial interface module.

Serial data transfer can take place on a point-to-point basis via the RS 232 interface.

If used in the SIPART DR19, DR21, DR22 and DR24 controllers, data can also be transferred across a serial bus using the RS 485 interface.

Which method is used (RS 232, RS 485) is determined using jumpers on the module.

Should you want to write your own interface software, a detailed technical description of the telegram traffic is provided for each type of controller.

The interface module provides galvanic isolation between the individual controllers and the higher-level system.

### Technical data 6DR2803-8C

#### SES module

Transmittable signals	RS 232 or RS 485
Transmittable data	Status values, process variables, parameters and configuring data
Type of transmission	According to DIN 66 258 A or B
Character format	10 bits (start bit, 7 data bits (ASCII format), parity bit and stop bit)
Transmission rate	300 to 9600 bit/s
Transmission	Asynchronous, half-duplex
Addressable stations	32
Watchdog timer for data traffic	1 to 25 s or none
Galvanic isolation	Up to 50 V AC/DC
RS 232 point-to-point - Line capacity <sup>1)</sup>	≤ 2.5 nF
- Line length recommendations	
Unscreened ribbon cable	≤ 50 m
Screened flat cable	≤ 25 m
RS 485 bus - Line capacity <sup>1)</sup>	≤ 200 nF
- Line length recommendations	
Unscreened ribbon cable	≤ 1200 m
Screened round cable	≤ 600 m

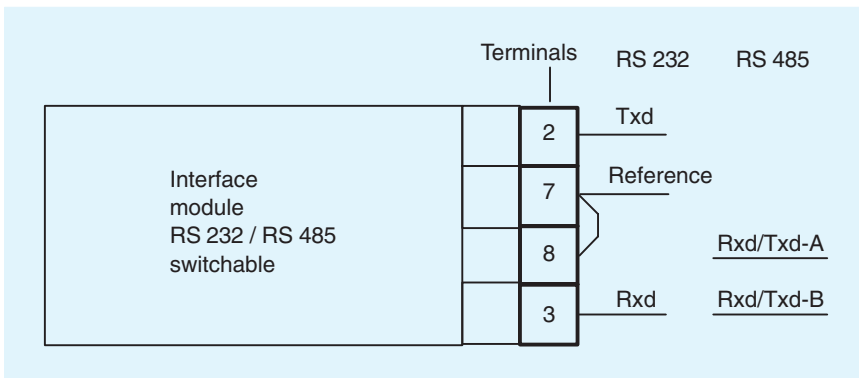


Fig. 8/12 Wiring of the SES module 6DR2803-8C

<sup>1)</sup> The cable capacity restricts the permitted line length.

## Interface modules

- Module 6DR2803-8P  
PROFIBUS DP interface for SIPART DR

The PROFIBUS DP interface for the SIPART DR controllers is designed as a plug-in option module. It can be used in all previously delivered SIPART DR controllers in the slot provided for the SES interface.

The interface module directly satisfies the PROFIBUS DIN 19 245, Parts 1 and 3 (without additional line driver).

The module has a 9-contact Sub-D socket for connection to the PROFIBUS DP. Standardized PROFIBUS plugs can be used here.

Data transmission is via a twisted RS 485 two-core cable. The power supply to the module is obtained internally direct from the controller.

The firmware of the SIPART DR19/21/22/24 controllers has been extended to the address range 0 to 125 for deliveries from 6/96 onwards. Earlier controllers of these types (address range 0 to 31) can be easily converted.

When connecting the SIPART DR 20 controllers (address range 0 to 31) to the PROFIBUS DP, they must be arranged in the corresponding address range.

The SIMATIC driver programs (function blocks) are available for connection of the SIPART DR controllers to SIMATIC S5/S7 via the PROFIBUS DP.

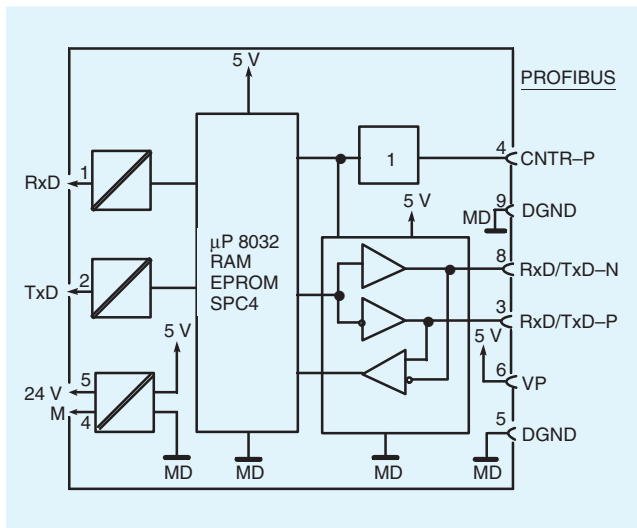


Fig. 8/13 Block diagram

## Technical data 6DR2803-8P

Transmittable signals Transmittable data	RS 485, PROFIBUS DP protocol Status flags, process variables, parameters and configuring switches To DIN 19 245 Parts 1 and 3
Transmission procedure PROFIBUS DP protocol	Certificate No.: Z00177 dated 16.09.1996
Certification by the PROFIBUS user organization e.V.	9.6 kbits/s to 1.5 Mbits/s 0 to 125 (note software version of controller) (0 to 31 with SIPART DR20)
Transmission rate Station No.	Max. UC 50 V common-mode voltage
Electrical isolation between Rx D/Tx D -P/-N and the device	AC 500 V
Test voltage	5 V -0.4 V/+0.2 V, short-circuit-proof CNTR-P
Repeater control signal CNTR-P	200 m; for further data see ET 200 manual 6ES5 998-3ES12
Cable lengths: per segment at 1.5 Mbits/s	

The GSD file (basic device data) file is required to connect the SIPART DR controllers to other systems. The DP master interface is parameterized using these data.

The following Instructions can be downloaded from Internet (see Section 10, Page 10/7):

- SIPART DR PROFIBUS interface / Instructions**  
(Description of the communication via PROFIBUS DP with the controller SIPART DR19/20/21/22/24)
  - German
  - English
- GSD file in "Controller"

The plug and cable must be ordered separately (e.g. from the Siemens catalog IK PI, also with integrated terminating resistor).



## Coupling relay module

- 6DR2804-8A coupling relay 230 V, 4 relays
- 6DR2804-8B coupling relay 230 V, 2 relays for snapping onto the rear of the controller

Note: observe max. switching voltages! (resonance magnification on phase shift motors)

The coupling relays can be snapped onto a mounting rail on the rear of the SIPART DR19, SIPART DR21, SIPART DR22 and SIPART DR24 controllers.

The mounting rail is supplied with the coupling relay.

The 6DR2804-8A coupling relay contains 4 relays. Two terminal strips with 9 terminals each are provided for connection purposes.

Technical data 6DR2804-8A and -8B		
<b>2 or 4 coupling relays</b>		
Relay design	CO contact with spark suppressor	
Contact material	Silver/Cadmium Oxide	
Contact rating <sup>1)</sup>	AC	DC
Max. switching voltage	≤ 250 V	≤ 250 V
Max. switching current	≤ 8 A	≤ 8 A
Max. switching capacity	≤ 1250 VA	≤ 100 W at 24 V ≤ 30 W at 250 V
Service life	2 · 10 <sup>7</sup> switching operations	
Mechanical	2 · 10 <sup>6</sup> switching operations	
Electrical 230 V AC, Ω loading		
Spark suppressor	22 nF and 220 Ω connected in series, with 420 V varistor wired in parallel	
Excitation coil <sup>1)</sup>		
Voltage	+19 to 30 V	
Resistance	1.2 kΩ ± 180 Ω	
Degree of protection EN 60 529		
Housing	IP 50	
Terminals inserted	IP 20	
Housing material	Polyamide 66	
Fitting to mounting rail	On NS 35/7.5 to DIN EN 50 022 or NS 35/15 according to DIN EN 50 035 NS 32 according to DIN EN 50 035	

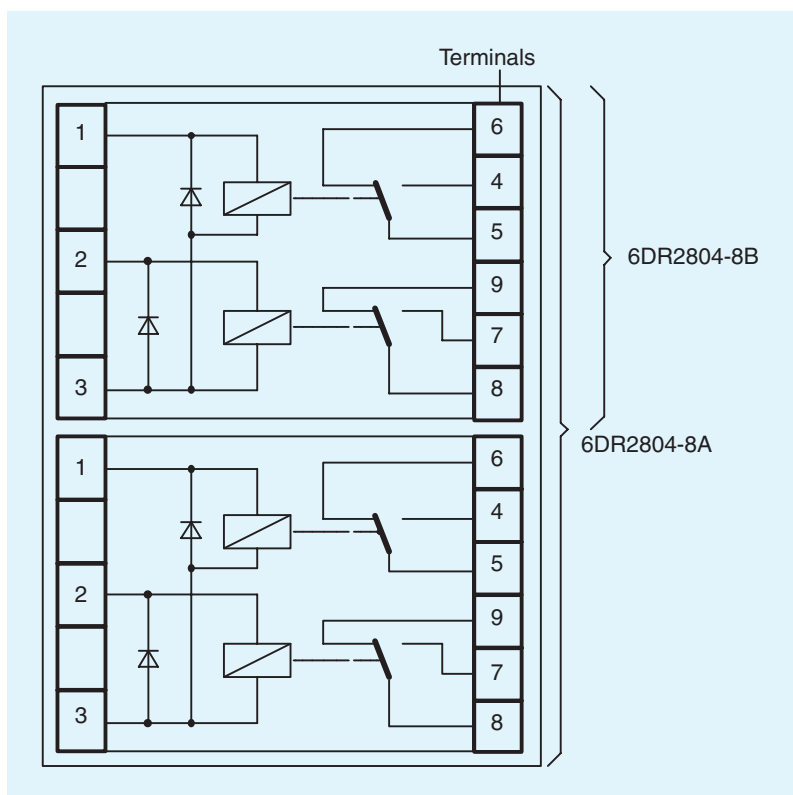


Fig. 8/14 Coupling relay module 6DR2804-8A and 6DR2804-8B

<sup>1)</sup> Excitation coil and contacts safely isolated through the use of reinforced insulation conforming to DIN/VDE 0106 Part 100 (Nov. 1986). Ventilation and creepage paths for surge class III and pollution level 2 according to DIN/VDE 0110 Part 1 January 1989.

Contacts on a relay module safely isolated through the use of reinforced insulation conforming to DIN/VDE 0106 Part 101 (Nov. 1986). Ventilation and creepage paths for surge class II and pollution level 2 according to DIN/VDE 0110 Part 1 January 1989.

## Ordering data

Ordering data	
	Order No.
Analog signal modules	
<b>U/I module</b> for current input 0/4 to 20 mA or voltage input 0/0.2 to 1 V or 0/2 to 10 V	<b>6DR2800-8J</b>
<b>3 U/I modules</b> with 3 analog inputs 0/4 to 20 mA or 0/0.2 to 1 V or 0/2 to 10 V (SIPART DR24 only)	<b>6DR2800-8A</b>
<b>R module</b> for resistance-based sensor	<b>6DR2800-8R</b>
<b>Pt 100 module</b> for Pt 100 resistance thermometer	<b>6DR2800-8P</b>
<b>TC module</b> for thermocouples or other mV signals	<b>6DR2800-8T</b>
<b>UNI module</b> for TC/RTD/R/mV signals, programmable (SIPART DR19/DR21 only)	<b>6DR2800-8V</b>
<b>y-hold module</b> (SIPART DR22/DR24 only)	<b>6DR2802-8A</b>
<b>3AO/3DI module</b> for the extension of the analog outputs and the digital inputs	<b>6DR2802-8B</b>
Switching signal modules	
<b>5DI module</b> with 5 digital inputs (not with SIPART DR20)	<b>6DR2801-8C</b>
<b>2DO relay module</b> with 2 relay outputs	<b>6DR2801-8D</b>
<b>4DO/2DI module</b> with 4 digital outputs and 2 digital inputs	<b>6DR2801-8E</b>
Interface modules	
<b>SES module</b> for serial communication via RS232/RS485 interface	<b>6DR2803-8C</b>
<b>PROFIBUS DP module</b> for direct communication via the PROFIBUS DP	<b>6DR2803-8P</b>
Coupling relay module	
<b>Coupling relay module</b> with 2 relays (AC 250 V) with 4 relays (AC 250 V)	<b>6DR2804-8B</b> <b>6DR2804-8A</b>
<b>Reference junction terminal</b> for TC, internal (for use in conjunction with SIPART DR19/AE1 and UNI module)	<b>6DR2805-8A</b>
<b>Measuring range connector</b> for $I = 20 \text{ mA}$ and $U = 10 \text{ V}$ (for use in conjunction with SIPART DR19/AE1 and UNI module)	<b>6DR2805-8J</b>

### Available ex-stores:

Items marked ■ are available ex-stores.