

Driver Unit type SRB 3101

Manual



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About this manual

This manual is intended for construction personnel and anyone else who may require technical information about the SRB 3101 driver unit.

The terminal designation is written in *Italics*.

Description

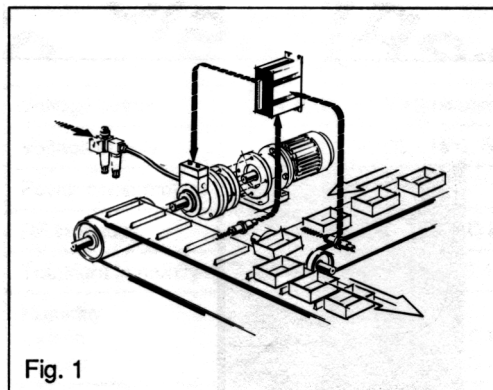


Fig. 1

The SRB 3101 driver unit is designed for driving the *RotaStep* clutch/brake unit or the SRA Precision Step Unit of the Danfoss Precision Step Systems.

SRB 3101 features include:

- Start and stop signal suppression
- PLC interfacing facilities
- Programmable signal inputs:
edge sensitivity, NPN/PNP signal types
- Free mode
- 24V d.c. output

The SRB 3101 driver unit can be used in conjunction with *RotaStep* or SRA for a wide range of applications, primarily where starting and stopping are controlled by sensor signals.

The SRB 3101 has facilities for interaction with other control units, for example PLCs.

Principle of operation

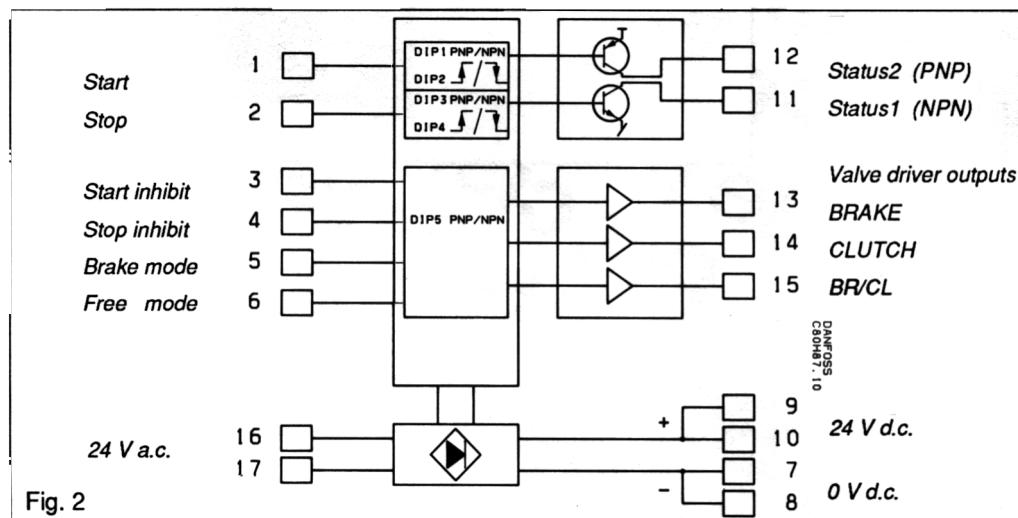


Fig. 2

Function description

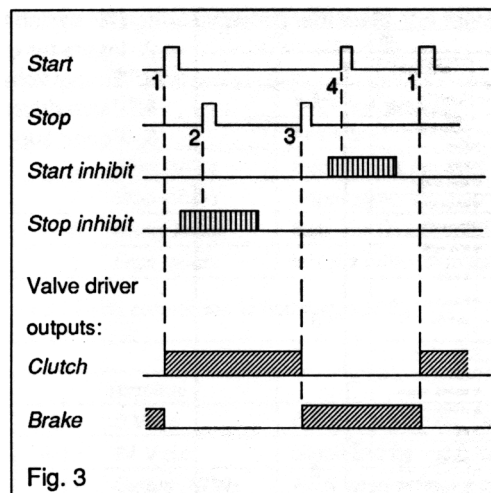


Fig. 3

Start inhibit/Stop inhibit

1. A signal supplied at the *Start* input turns the *Clutch* output on.
2. When *Stop inhibit* is active, signals supplied at the *Stop* input are ignored.
3. A signal supplied at the *Stop* input turns the *Brake* output on, and the *Clutch* output off.
4. Start signals are ignored as long as *Start inhibit* is active.

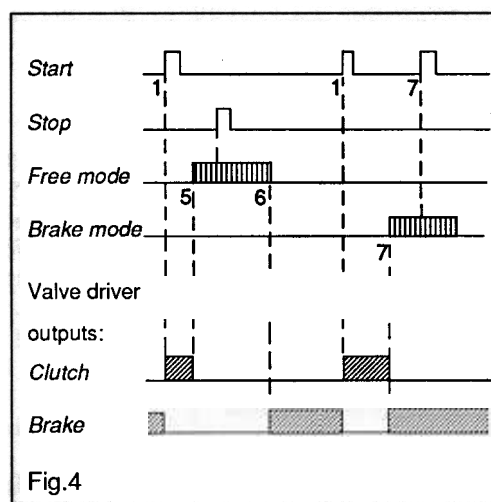


Fig. 4

Free mode/Brake mode

5. Activation of *Free mode* turns both valve driver outputs off. The output shaft of the *RotaStep/SRA* unit can then rotate freely.
6. When *Free mode* is deactivated, the condition of the valve driver outputs is determined by the latest activated input mode. In this example, the *Stop* input was activated during the *Free mode* period. Consequently, the *Brake* output is turned on.
7. Activation of *Brake mode* turns on the *Brake* output, and start signals are ignored. Only *Free mode* overrides *Brake mode*.

Valve driver output

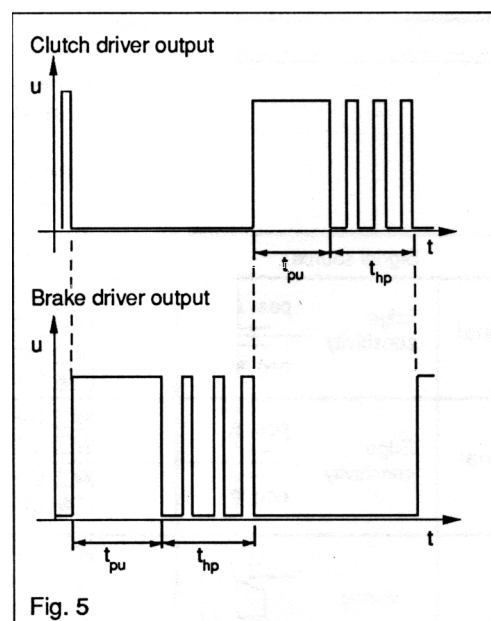


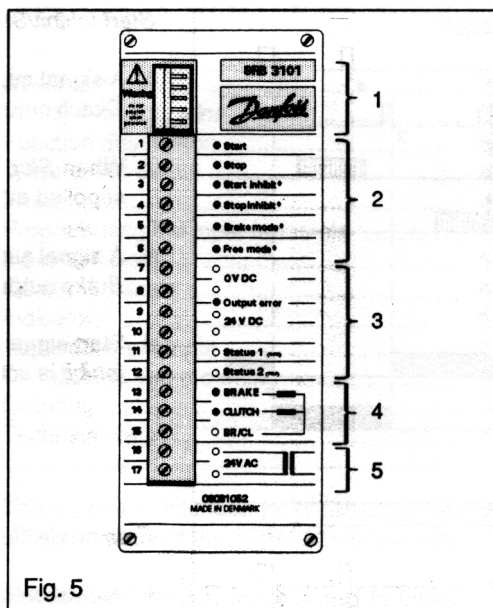
Fig. 5

The solenoid valve driver signal consists of a pick-up pulse t_{pu} and a holding period t_{hp} . The pick-up pulse ensures fast activation of the solenoid valves.

The duration of the holding period is depending on the cycling frequency of the *RotaStep/SRA*. During the holding period, the valve output voltage is chopped to decrease the current. This minimizes heat dissipation in the solenoid coils and ensures fast release of the solenoid valve.

The output signals to the two solenoid valves interact as indicated in fig. 5.

Front



1. DIP switch for setting the inputs
2. Inputs for external control signals
3. Supply voltage and status outputs
4. Valve driver outputs
5. Power supply

Fig. 5

Setting the input terminals

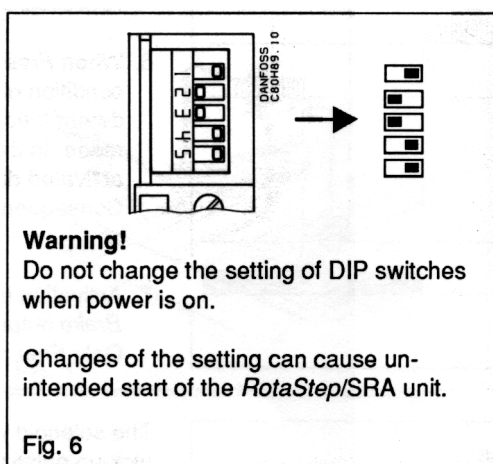


Fig. 6

By means of the DIP switches on the front of the SRB 3101 it is possible to set the input terminals to accept signals from a wide range of signal sources, including start and stop signals from the same source.

Start terminal signal source type PNP or NPN is set by DIP 1.

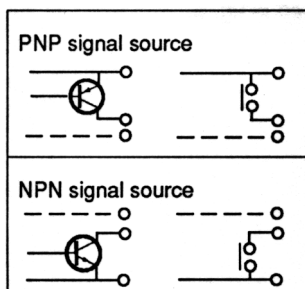
Start terminal edge sensitivity is set by DIP 2.

Stop terminal signal source type PNP or NPN is set by DIP 3.

Stop terminal edge sensitivity is set by DIP 4.

Input terminals 3 to 6 are set to PNP or NPN signal sources by DIP 5.

The setting of DIP switches appears from the below table.



Signal source:		PNP	NPN
Setting <i>Start</i> terminal	Edge sensitivity	pos.	pos.
	neg.	neg.	neg.
Setting <i>Stop</i> terminal	Edge sensitivity	pos.	pos.
	neg.	neg.	neg.
Setting <i>Start</i> and <i>Stop</i> when using single signal source	Wiring	DIP 1 DIP 2 DIP 3 DIP 4	DIP 1 DIP 2 DIP 3 DIP 4
Setting terminal 3-6		DIP 5	DIP 5

Input terminals

By activating the following terminals, the functions described below can be obtained:

Terminal	Functions
1 <i>Start</i>	Activates the clutch valve driver output
2 <i>Stop</i>	Activates the brake valve driver output
3 <i>Start inhibit</i>	Suppresses the start signal
4 <i>Stop inhibit</i>	Suppresses the stop signal
5 <i>Brake mode</i>	Sets the <i>RotaStep</i> /SRA unit in brake mode
6 <i>Free mode</i>	Inhibits driver signals and enables the output shaft to rotate freely

Note! Earth connection to housing, see fig. 10.

Output terminals

Terminal	Functions
7-8 <i>0 V d.c.</i>	0 V d.c. reference. Do not connect to earth!
9-10 <i>24 V d.c.</i>	Stabilized 24 V d.c. output, max. load 300 mA
11 <i>Status (NPN)</i>	NPN open collector output. On (0 V) when SRB 3101 is in Clutch mode
12 <i>Status (PNP)</i>	PNP open collector output. On (24 V) when SRB 3101 is in Clutch mode
13 <i>BRAKE</i>	Driver output for brake solenoid valve
14 <i>CLUTCH</i>	Driver output for clutch solenoid valve
15 <i>BR/CL</i>	Connection to the common point of the solenoid valves. Do not connect to 0 V d.c. or earth!
16-17 <i>24 V a.c.</i>	Power supply. See technical data page 8

Indicators

The LEDs at the following terminals indicate that the input or output is active:

LED
<i>Start</i> *)
<i>Stop</i> *)
<i>Start inhibit</i>
<i>Stop inhibit</i>
<i>Brake mode</i>
<i>Free mode</i>
<i>Output error</i> **)
<i>BRAKE</i>
<i>CLUTCH</i>

*) If inputs are set to PNP neg. edge or NPN pos. edge, LED lights up when terminals are inactive.

**) *Output Error* LED lights up if a short-circuit has been detected at any output terminal. Check all output connections for short-circuits. Turn off power (min. 15 s) to reset. Solenoid valve coil resistance must be as listed below:

<i>RotaStep</i> 06, 08, 10, 12	9.5 Ω to 16 Ω
<i>RotaStep</i> 15 and SRA 10	8.5 Ω to 12 Ω
SRA 15 to 36	4.2 Ω to 6 Ω

The resistance depends on coil temperature.

Application examples

Stop by counter

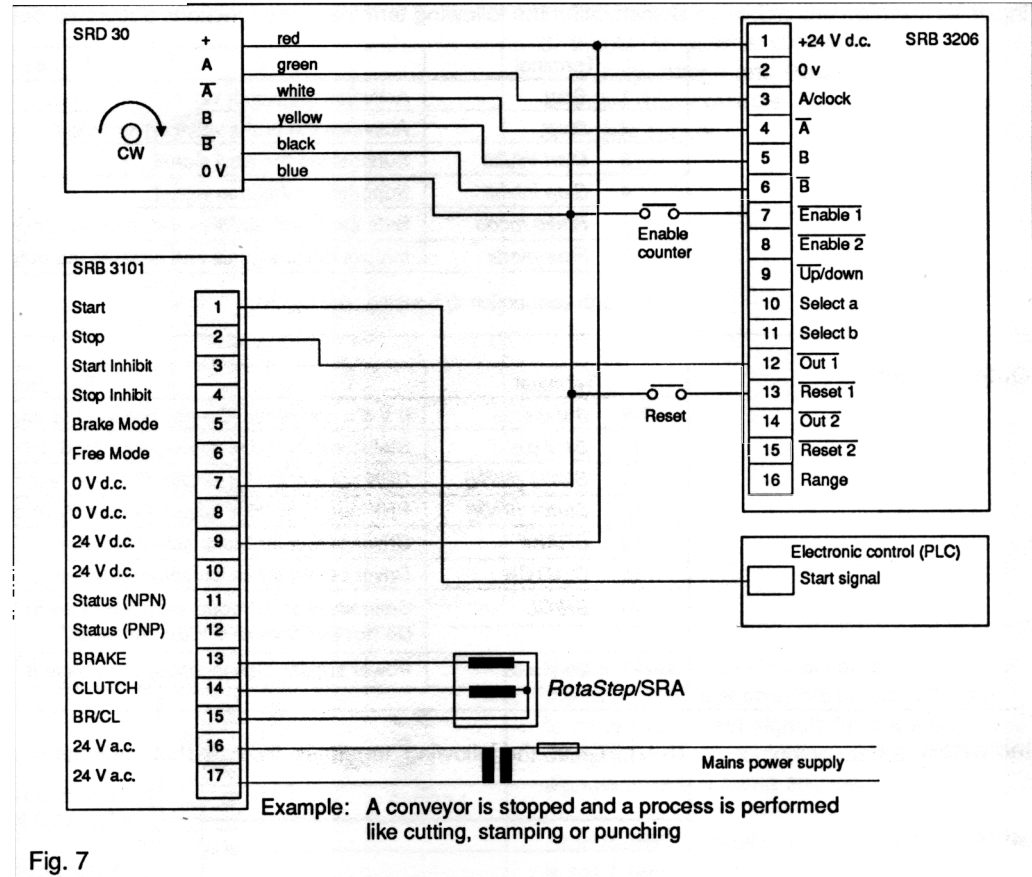


Fig. 7

Start by counter

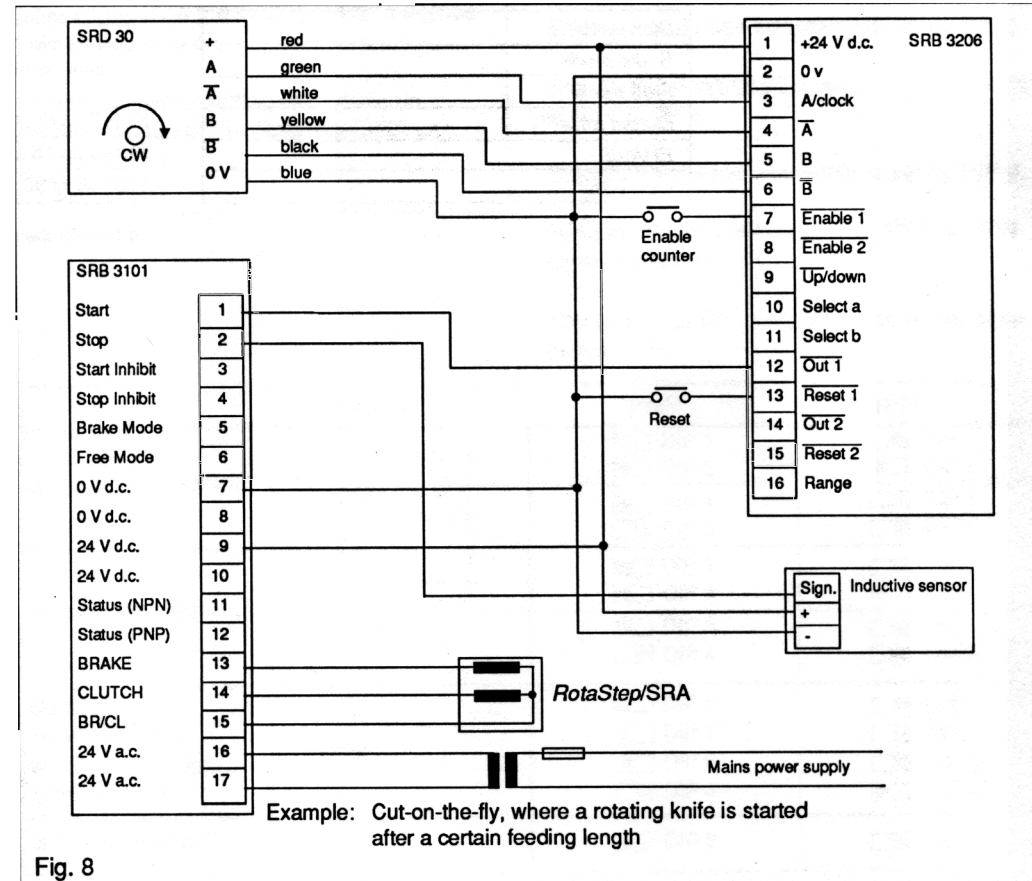


Fig. 8

Stop by mark

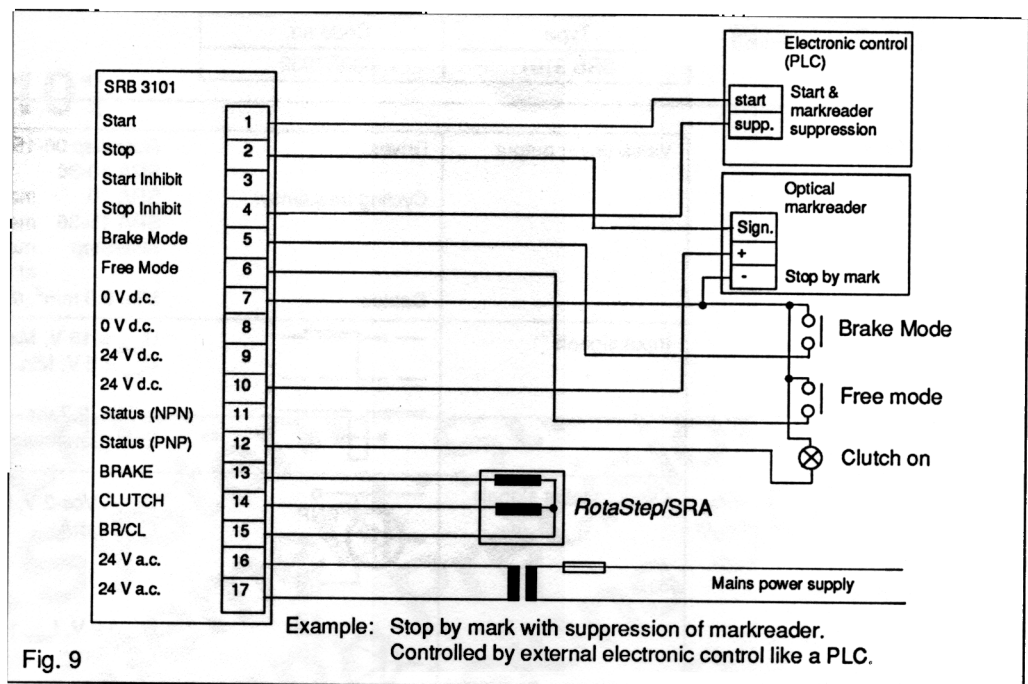
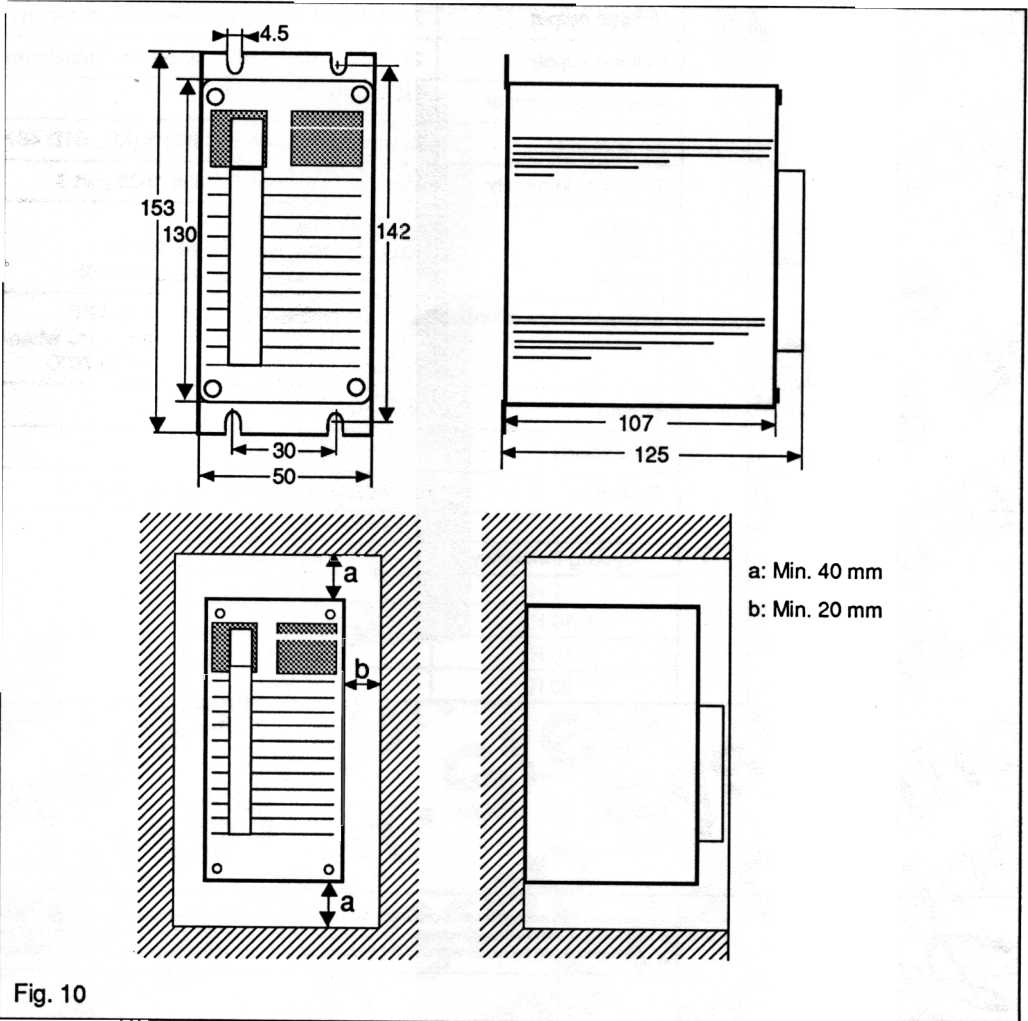


Fig. 9

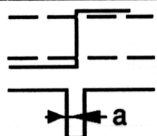
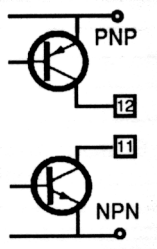
Dimensions and mounting



Ordering

Type	Code no.
SRB 3101	080B1052

Technical data

Valve driver output	<p>Drives: <i>RotaStep</i> 06-15 SRA 10-36</p> <p>Cycling frequency: SRA 10 max. 30 Hz SRA 15-36 max. 20 Hz <i>RotaStep</i> max. 20 Hz at 40°C ambient temperature</p> <p>Cables: Min. 0.5 mm², max. 0.25 Ω per lead</p>
Input signals	 <p>$U_{high} > 16 \text{ V}$. Max. 30 V $U_{low} < 2 \text{ V}$. Min. 0 V</p> <p>a: Min. 0.7 ms Earth connection to housing, see fig. 10</p>
Output status signals	 <p>$U_{high} \setminus V_{cc} - 2 \text{ V}$, $I_{max} 100 \text{ mA}$ $I_{leak} 1 \text{ mA}$</p> <p>$U_{low} \setminus 2 \text{ V}$, $I_{max} 100 \text{ mA}$ $I_{leak} 1 \text{ mA}$</p>
Voltage output	24 V d.c. $\pm 1 \text{ V}$ stabilized (at nominal supply). Max. total current load: 300 mA
Voltage supply	24 V a.c. +10%, -15%, 50-60 Hz. Transformer max. 75 VA *)
Power consumption	Max. 40 W
RF immunity	In accordance with IEC 801-3 (MIL-STD 462 notice 3)
Transient immunity	In accordance with SS 436 1503 part 3
Humidity - static - cyclic	In accordance with IEC 68-2-3 Ca In accordance with IEC 68-2-3-30 Db
Ambient temperatures	<p>During operation: 0 to 40°C 0 to 50°C when 24 V d.c. is not used</p> <p>Storage: -40 to 70°C</p>
Weight	0.43 kg
Dimensions	153 x 50 x 125 mm
Enclosure	Anodized aluminium housing, IP20

*)

Cycling frequency	Transformer
1 Hz	> 20 VA
5-10 Hz	> 25 VA
15 Hz	> 30 VA
20 Hz	> 35 VA