Precision-
Step Unit

MSW Motion Control GmbH

MCS02

Electric Driver Unit

Description

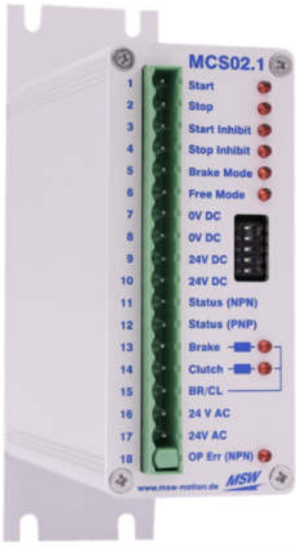


Fig 1

The MCS02 electronic control unit from MSW Motion Control GmbH is designed for driving the Precision Step Units (RotaStep or SRA) of ATB Laurence Scott.

MCS02 features include**:**

- Start/Stop signal suppression
- PLC interfacing facilities
- Programmable signal inputs:
  NPN/PNP signal types, edge sensitivity
- Free mode
- 24 Vdc output
- ERROR – Output signal

In combination with RotaStep or SRA, the MCS02 can be used for a wide range of applications, especially when starts and stops are triggered by sensor signals.

The MCS02 has facilities for interaction with other control units, for example PLCs.

Input terminals

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

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

Please note! Earth connection, see Fig 10.

Output terminals

Terminal		Function
7 - 8	0 Vdc	0 Vdc reference - **Do not connect to earth!**
9 - 10	24 Vdc	Stabilized 24 Vdc output, max. load 300 mA.
11	Status (NPN)	NPN open collector output. On (0 Vdc) when MCS02 is in clutch mode.
12	Status (PNP)	PNP open collector output. On (24 Vdc) when MCS02 is in clutch mode.
13	Brake	Driver Output for brake solenoid valve.
14	Clutch	Driver Output for clutch solenoid valve.
15	BR/CL	Connection to the common point of the solenoid valves. **Do not connect to earth or 0 Vdc!**
16 - 17	24 Vac	Power supply. See technical data page 6.
18	O/P Error	NPN open collector output. On (0 Vdc) when MCS02 detects a short circuit.

Please note! When replacing SRB 3101 in SRB 3102 or MCS02 and continuing to use the old 17-pole terminal strip, the lower terminal (18) must be kept free.
To prevent incorrect assembly, terminal (18) is blocked. When using the 18-pole terminal strip, this blocking must be removed.

Data sheet MCS02 – Electric Driver Unit

MSW Motion Control GmbH

Indicators

LED
Start*)
Stop*)
Start inhibit
Stop inhibit
Brake mode
Free mode
Output error**)
Brake
Clutch

*) If inputs are set to PNP (negative edge) or NPN (positive edge), LED's lights up when terminals are inactive.

**) Output-Error LED lights up if a short-circuit has been detected at any output terminal.

After removing the short circuit, the mains supply must be switched off for at least 15 seconds to be ready for operation again.

Resistance of the solenoid coils

Type	Resistance [Ω]
RotaStep 06 - 12	9.5 - 16
RotaStep 15 and SRA 10	8.5 - 12
SRA 15 - 36	4.2 - 6

The resistance depends on coil temperature.

Function description

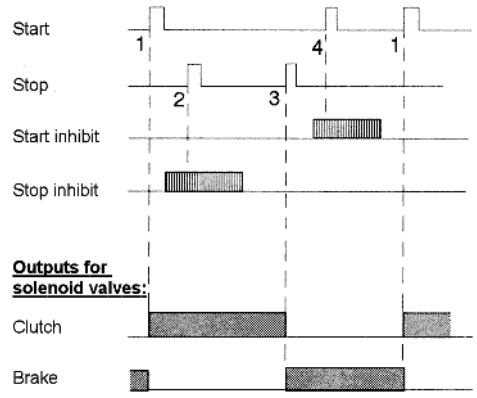


Fig 2

Start inhibit / Stop inhibit

1. A signal at the Start input activates the clutch function and simultaneously opens the brake.
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.

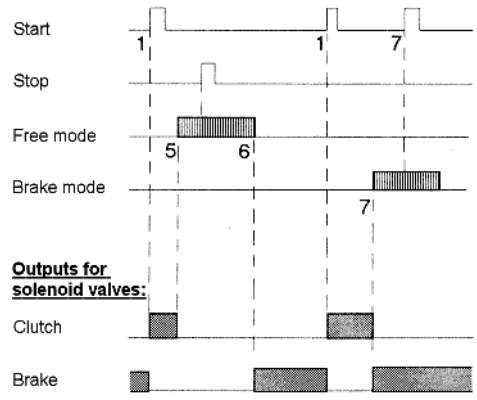


Fig 3

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 output 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

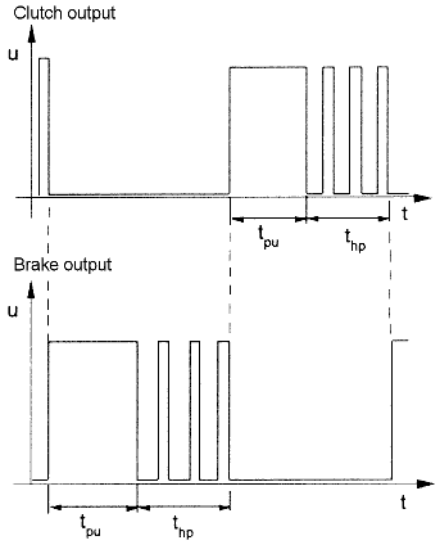


Fig 4

The output voltage for controlling the solenoid valves consists of the overexcitation (in the time range t_{pu} - 30 V) and the holding voltage (in the time range t_{hp}).
The overexcitation ensures short reaction times of the solenoid valves.
The holding voltage (average value approx. 6-8 V) is maintained until the next signal change.

After overexcitation, the output voltage is clocked to limit the current. This also minimises heating and enables a quick shutdown.

The output signals to the two solenoid valves interact as indicated in fig. 4.

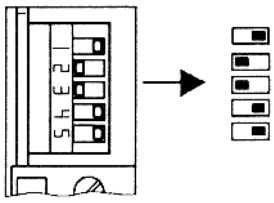


Fig 5

Warning!
Do not change the setting of DIP switches when power is on.

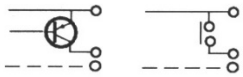
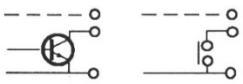
Changes of the setting can cause un-intended start of the RotaStep / SRA unit.

With the frontside DIP switches, the control unit can be prepared for a wide range of input signals, including start and stop from just one signaller.

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

Start terminal edge sensitivity (positive or negative) is set by DIP 2.
Stop terminal signal source type PNP or NPN is set by DIP 3.
Stop terminal edge sensitivity (positive or negative) 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	
PNP signal source 	Setting Start terminal	Edge sensitivity	pos.		DIP 1 DIP 2		DIP 1 DIP 2
			neg.		DIP 1 DIP 2		DIP 1 DIP 2
NPN signal source 	Setting Stop terminal	Edge sensitivity	pos.		DIP 3 DIP 4		DIP 3 DIP 4
			neg.		DIP 3 DIP 4		DIP 3 DIP 4
	Setting terminal 3-6				DIP 5		DIP 5

Application example:

Stop by counter

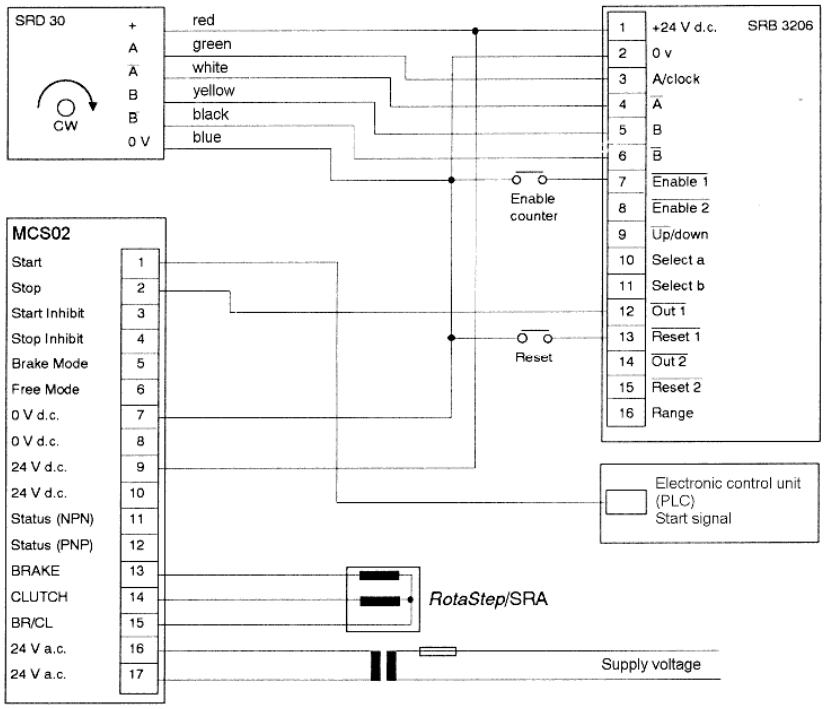


Fig 6 A conveyor is stopped and a process is performed such as cutting, stamping or punching.

Application example:

Start by counter

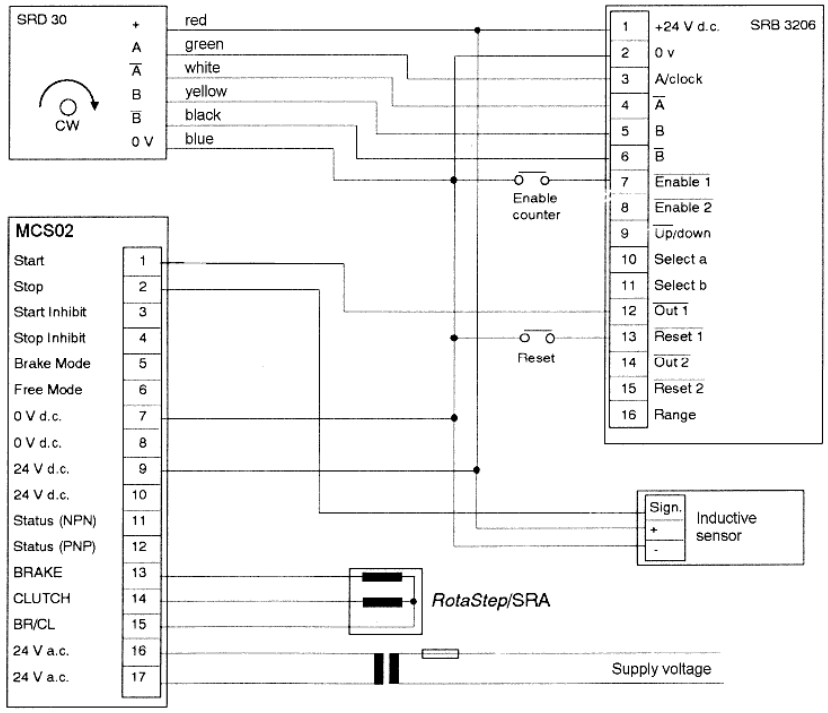


Fig 7 Cut-on-the-fly, where a rotating knife ist started after a certain feeding length.

Application example:

Stop by mark

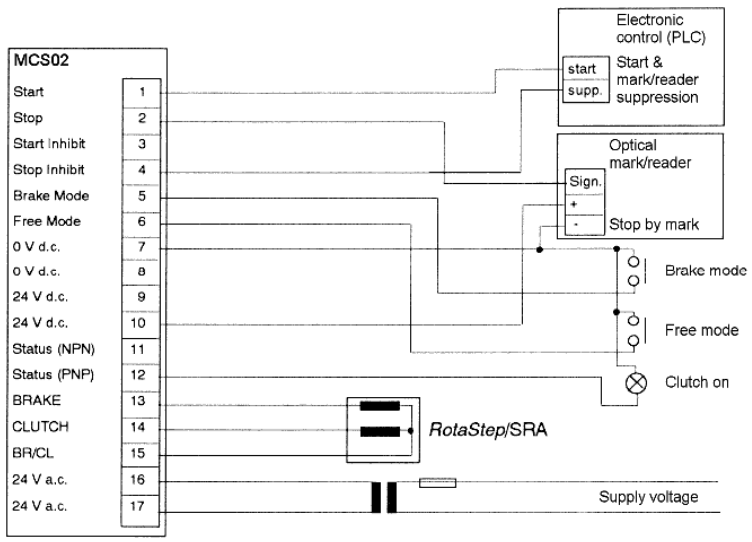


Fig 8 Stop by mark with suppression of markreader. Controlled by external electronic control such as a PLC.

Measures and Assembly

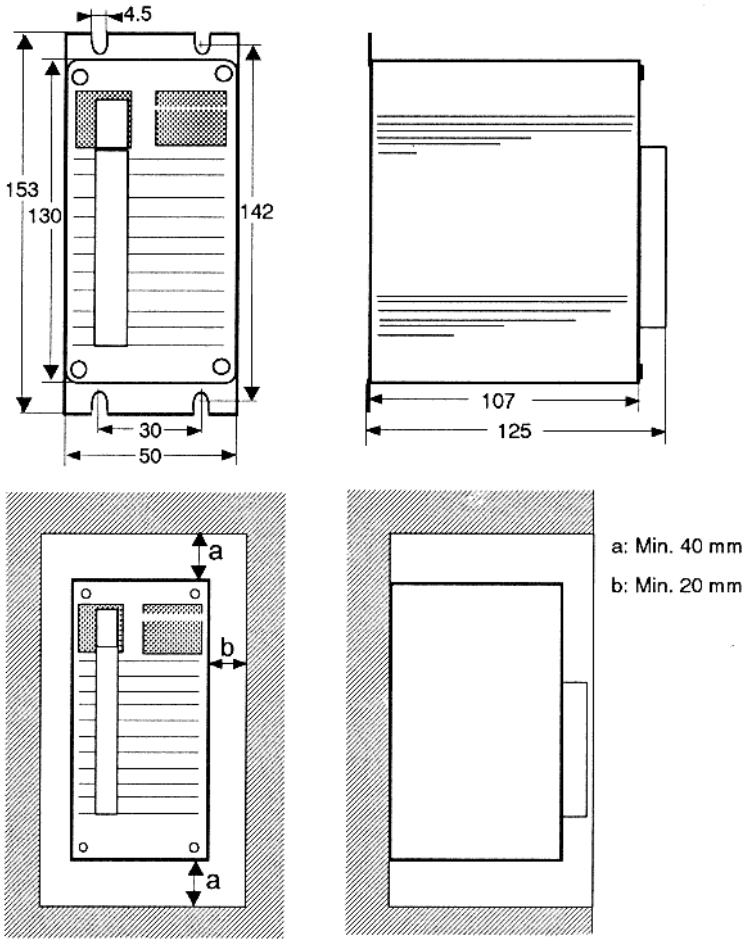
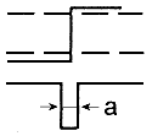
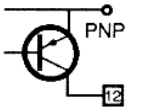
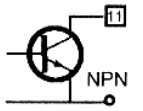


Fig 9

Technical data

Valve driver output	Max. Clock frequency	SRA 10	max. 30 Hz
		SRA 15 – 36	max. 20 Hz
		RotaStep	max. 20 Hz
		at 40 °C ambient temperature	
	Conductor (cable)	Diameter per core: min. 0.5 mm² Power per core: max. 0.25 W	
Input signals		U_{high} > 16 V U_{low} < 2 V	Max. 30 V Min. 0 V
		a: Min. 0.7 ms Earth connection to housing	
Status signals		U_{high}: 2 V V_{CC}: 2 V I_{max}: 100 mA I_{leak}: 1 mA	
		U_{low}: 2 V I_{max}: 100 mA I_{leak}: 1 mA	
Voltage output	24 Vdc. ±1 V (at nominal supply) - Max. Current load: 300 mA		
Voltage supply	24 Vac +10 %, -15 %, 50-60 Hz. Upstream transformer max. 75 VA *)		
Power consumption	Max. 40 W		
Interference suppression	In Accordance with IEC 801 -3 (MIL-STD 462 notice 3)		
Transient protection	In Accordance with SS 436 1503 part 3		
Humidity	Storage	In Accordance with IEC 68-2-3 Ca	
	In operation	In Accordance with IEC 68-2-3-30 Db	
Ambient temperature	Storage	-40 – 70 °C	
	In operation	0 – 40 °C	
		0 - 50 °C if 24 Vdc are not required	
Weight / Dimensions	0,43 kg / 153x50x125 mm		
Enclosure	Anodized aluminium housing, IP20		

Transformer

Clock frequency	Power	Clock frequency	Power
1 Hz	>20 VA	15 Hz	>30 VA
5-10 Hz	>25 VA	20 Hz	>35 VA

EMC Filter Installation Instructions

In order to meet the EEC Directive for EMC, the equipment should be installed as shown using the recommended filter.

1. Mains and output cables should not be run together.
2. Control cables should be separated from output cables.
3. Control cables should be screened.
4. MCS02 Driver Case should be earthed.

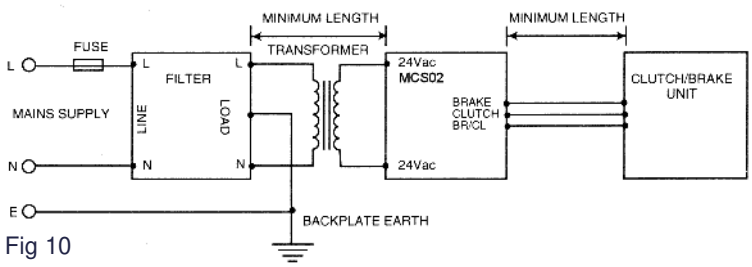
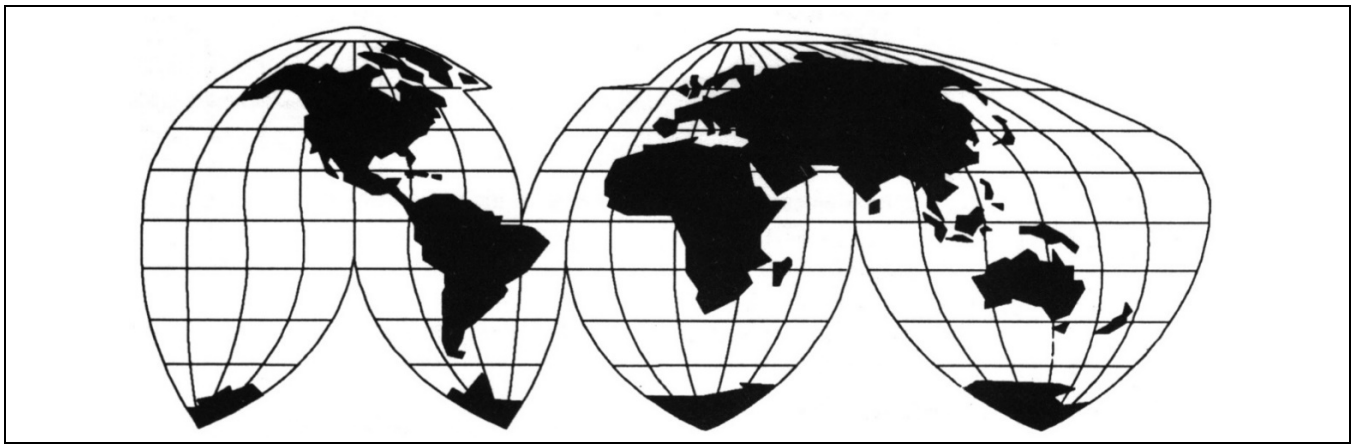


Fig 10

„Precision Step Systems“ is a line of products from ATB Laurence Scott



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