

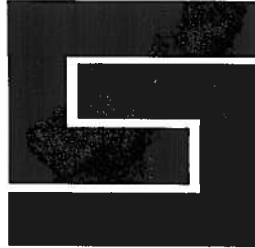


TECHNICAL NOTICE SMRB2

SMRB2-* Modules

NTRB-0326

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REFERENCE MANUAL

LATCHING RELAYS

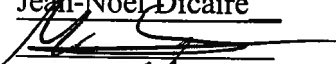

SMRB2

NTRB-326 REV. 0



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SMRB2 Latching relays

General information

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SMRB2 Latching relays**PREFACE**

This manual describe the SMRB2 Latching Relays configurations presently available, and not a generalization of all the SMRB2 Latching Relay types that could be possibly be designed.

Here are bellow, the configurations described in this manual:

- SMRB2-A
- SMRB2-B
- SMRB2-B1
- SMRB2-B2
- SMRB2-C
- SMRB2-CL
- SMRB2-E
- SMRB2-E1
- SMRB2-EL

For more information on other SMRB2 configurations eventually available, please contact Snemo Ltd.

ENGINEERING CHANGE NOTICE

The SMRB2-* Latching Relays module, form a family of relays with different configurations, described above.

Until February 1994, these modules were composed of auxiliary relays type 3307, from Mors Company.

Since March 1994, Snemo Ltd. uses, instead of the 3307, relay type SP4-PL2 from Aromat Company. The SMRB2-* family, continues to offer the same configurations than before. In order to distinguish this change, keeping the compatibility with other modules, the new bistable module is named SMRB2-*, followed by the corresponding configuration.

SMRB2 Latching relays

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SMRB2 Latching relays**1. PRESENTATION****1.1 FUNCTIONS AND APPLICATIONS**

The SMRB2 auxiliary latching relays family, are mainly intended for automatic selection between certain sources or conditions of electrical fittings, insuring an automatic transfer of operations, thanks to their bistable relays.

The most common application of these modules is the transfer and memorization of command by the bistable relays. Their characteristics allow the control of a serie of triggering and signaling devices, without the use of supplementary relays.

The contacts can withstand a constant current of 5 amperes.

1.2 DESCRIPTION

The SMRB2 type relays are all the same size, only the outputs differs depending on the connection mode of their triggering contacts.

The SMRB2 modules can be composed of 2 or 4 electromagnetic relays, depending on the number of output contacts desired.

The following relays are used for the different SMRB2 serie configurations:

CONFIGURATION	RELAYS	RELAY' S CONNECTION MODE
SMRB2	AROMAT SP4-PL2-DC	SERIE

SMRB2 relays are presented in a one seat module form, fitting inside the Versa's racks, to form a whole and protection systems.

SMRB2 Latching relays**2. CHARACTERISTICS**

Some configuration of the SMRB2 have a LED display on the front plate which indicates the relay's coils activation.

2.1 COMMAND/CONTROL INPUT (standard version)

Typical voltage.....	24 V _{DC} / 129 V _{DC} ⁽¹⁾
Minimum voltage.....	21 V _{DC} / 105 V _{DC}
Maximum voltage.....	28 V _{DC} / 141 V _{DC}
operating threshold.....	15 V _{DC} / 75 V _{DC}

Voltage limits

2 s	35 V _{DC} / 160 V _{DC}
30 s	32 V _{DC} / 150 V _{DC}

Power consumption (SMRB2-B configuration @ 129 V_{DC})

Typical voltage	< 2.6 W
Minimum voltage operation	< 1.6 W
Maximum voltage (permanent)	< 3.0 W

2.2 OUTPUTS

Numbers / Type (NO, NC, Inv., Stat.).....max: 16 form A or B, or 8 form C

Current limits

Constant	5 A _{DC}
1 s	40 A _{DC}
200 ms	50 A _{DC}
30 s	10 A _{DC}
Closing (200 ms)	30 A _{DC}
Opening (Inductive, L/R=40ms, V=129 V _{DC})	0.4 A _{DC}

Maximum voltage allowed

Permanent	500 V _{DC}
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(1) For other values of voltages, please contact Snemo Ltd..

SMRB2 Latching relays**2.3 LIGHT INDICATORS (LED option)**

Number	4 max.
Consumption per indicators	< 0.25 W

2.4 FONCTIONNAL TIME WITHOUT BOUNCING @ V typ

	<u>Typical</u>	<u>Min</u>	<u>Max</u>
Operation time	14 ms	11 ms	50 ms

2.5 STRUCTURE

Module

Lenght	41,5 mm
Height	177,0 mm
Depth	297,0 mm
Weight	1300g (max.)

Material

Frame	Stainless steel
Back connector	Bakeline
Printed circuit	Epoxy
Front support	Aluminum
Front plate	Aluminum
Silk screen (indications)	Thermoplastic ink

Number of connecting points

Typical	0
Short-circuited	0
Voltage type	37 max.

Packing

Width	75 mm
Height	285 mm
Depth	340 mm
Weight	250 g

Packing material

Box	Cardboard
Internal protection	Plastic bubble sheet and peanuts

SMRB2 Latching relays**2.6 ENVIRONMENT**

Temperature

Storage	-25 @ + 70°C
Operating	-20 @ + 40°C

Humidity

Storage	<90%
Operating	<98%

Insulation withstand

Dielectric withstand 60Hz	1500 Vac (rms)
Insulation resistance	> 1000 MΩ
Static shoks withstand	2500 V (peak)

Disturbances immunity

HF disturbances (SWC)	2500 V peak
Radio wave disturbances	15 V/m

SMRB2 Latching relays**3. CONNECTIONS AND KEY CODES****3.1 CONNECTIONS**

SMRB2 modules are available in different configurations. The following pages, show the different possibilities for connecting the relays and different output contact configurations.

We can observe, that the contacts can be of type A, B or C. Since the relays are bistable, their coils are interconnected: one coil for the SET and the other for RESET.

SMRB2 Latching relays**3.2 KEY CODES**

Each configuration has its own key code, indicated in the table below ⁽¹⁾:

MODULE	KEY CODES	CONNECTOR		POWER SUPPLY
		A	B	
SMRB2-A	611 111	U		250VDC
	464 213	U		129VDC
	611 122	U		24VDC
SMRB2-B	611 112	U	U	250VDC
	265 223	U	U	129VDC
	111 234	U	U	24VDC
SMRB2-B1	611 123	U	U	250VDC
	361 223	U	U	129VDC
	111 361	U	U	24VDC
SMRB2-B2	611 113	U	U	250VDC
	465 223	U	U	129VDC
	611 124	U	U	24VDC
SMRB2-C	611 114	U	U	250VDC
	365 253	U	U	129VDC
	611 125	U	U	24VDC
SMRB2-CL	611 114	U	U	250VDC
	365 253	U	U	129VDC
	611 125	U	U	24VDC
SMRB2-E	611 115	U	U	250VDC
	611 126	U	U	129VDC
	611 131	U	U	24VDC
SMRB2-EL	611 116	U	U	250VDC
	611 132	U	U	129VDC
	611 133	U	U	24VDC
SMRB2-E1	611 121	U	U	250VDC
SMRB2-E3	111 416	U	U	24VDC
SMRB2-E2	611 134	U	U	129VDC

(1) These codes are identical to the configuration codes of the previous module SMRB (see the Engineering change notice on page III).

SMRB2 Latching relays**4. DESIGN AND OPERATION**

The modules from the SMBR2 series are composed of electromagnetic bistable relays, having 4 inverters each (form C). Depending on the desired configuration, 2 or 4 relays are required per function. Plus, according to the configuration, only certain types of contacts can be connected at the output terminal (from A, B or C contacts).

The SMRB2 configuration can have as much as 14 output contacts. These contacts can be Inverters, normally open or normally close.

The bistable modules are composed of two coils with complimentary functions: one coil for the SET and the other for the RESET, of the relay. When the SET coil is activated, it puts the relay's contacts in an opposite state than indicated on the front plate. When the RESET coil is activated, it puts the contacts in the same state than indicated on the front plate. These inputs cannot be activated simultaneously.

A blocking circuit is present on the command inputs, in order to desensitize the relay against transients. Typically, this circuit blocks the transmission of opening and closing orders if the input voltage is lower than half of the maximum voltage (ex.: 75 Volts for a supply of 140 Volts).

The blocking circuit output energizes the relay's coil, joined with a limiting resistor in series, to limit the thermal dissipation in those relays.

Some SMRB2 configurations have a LED display in front, to indicate the activation of the relay's coil. These lights have no function other than to inform the user. Failure of those lights, would not influence the module's operation.

SMRB2 Latching relays**4.1 AVAILABLE OPTIONS**

The following table dress up a list of different options available with, for each, the number of functions, the number and type of output contacts, the type of relay used, the number of LED and the connection type.

CONFIGURATION	RELAYS			FUNCTION NUMBER	CONTACT/FUNCTION			OUTPUT DIODE	LED QT
	TYPE	NUMBER PER FUNCTION	CONNECTION		INV	NO	NC		
SMRB2-A	SP4-PL2	4	SERIES	1	6	0	0	0	--
SMRB2-B	SP4-PL2	4	SERIES	1	4	11	1	0	--
SMRB2-B1	SP4-PL2	4	SERIES	1	4	9	3	0	--
SMRB2-B2	SP4-PL2	4	SERIES	1	4	5	5	0	--
SMRB2-C	SP4-PL2	2	SERIES	2	2	3	3	0	--
SMRB2-CL	SP4-PL2	2	SERIES	2	2	3	3	LED	4
SMRB2-E	SP4-PL2	4	SERIES	1	4	8	2	0	--
SMRB2-EL	SP4-PL2	4	SERIES	1	3	8	2	LED	1
SMRB2-E1	SP4-PL2	4	SERIES	1	4	8	2	0	--

SMRB2 Latching relays**5. RELIABILITY AND SECURITY****5.1 MTBF (Mean Time Between Failure) EVALUATION**

The reliability analysis of the SMRB2 modules shows that the electronic components used for the blocking circuit have no effect on the mean time between failures. For MTBF evaluation, the most important factor is relevant to the real utilization of the electromagnetic relays (working condition, load type, ...)

The principal influences on the MTBF are, the ambient temperature, the operating cycle (time ON, time OFF), the number of operations and the load connected to the contacts of the module.

Concerning the number of operations, the relays used have a mechanical life span of more than 100,000 actions. The operation cycle of the relay, is based on a complete cold down period, between operations. Consequently, if this condition is not fulfilled, it will result in a shorter life span of the relay.

The module's operating temperature affects equally its life span. In relation to a reference temperature of 25° C, the average time of a good working module is affected by a failure risk factor of 0.5% per additional degree (ex.: the risk at 40° C is superior by 7.5%, than the risk at 25° C).

5.2 MTTR (Mean Time To Repair) EVALUATION

Starting from the flowchart at the end, in the troubleshooting section, the evaluated average time to detect a defective component, in a SMRB2 module, is less than 10 minutes. The time required to execute the repair, depends upon the instruments available (soldering iron, crimping tool, etc.).

Due to the nature of the SMRB2 components, the repairs will always result in replacing the defective part, as it cannot be repaired on site.

Whichever component is defective, a module replacement is suggested for a temporary repair. This is preferred to troubleshooting the system.

Due to the possible visualization of the armature's movement, we are able to verify quickly whether the defect is a result of a mechanical or electrical break.

SMRB2 Latching relays**6. RECEPTION AND STORAGE**

The relays are shipped in cardboard boxes or cases, and protected from shocks when they are not mounted in a rack.

At the reception, an inspection must be made to check for any damages, due to transport.

If any anomalies are detected, from the handling, you must notify Snemo Ltd. immediately.

If they are not to be installed immediately, they must be stored, in their original packing, in a dust free area, and at a temperature between -25 and +70° C with a humidity level of 90% or higher.

SMRB2 Latching relays**7. COMMISSIONING****7.1 NECESSARY MATERIAL**

<u>Generation</u>	<u>Range</u>	<u>Precision</u>	<u>Stability</u>	<u>Other</u>
Auxiliary Power supply	105-141V	---	---	1 A

Other equipment

An audio or visual indicator of continuity.

7.2 PRESCRIBED TESTS

Standard tests for commissioning consist of verifying the continuity of the output contacts, by applying and removing a test voltage on a function.

At first, all contacts are checked, with a continuity indicator, when the function is not being energized. The states must be identical to the ones indicated on the front panel or on the wiring diagram. Then, the minimum voltage of operation is applied to the function.

If a suitable power supply is not available for this particular test, then energize the module with a voltage between the minimum for functioning and the maximum permanent allowed.

When the coil is energized, re-verify all the contacts. Their states must be inverted from their states indicated on the module's front panel .

If a chronometer is available, it would be useful to check the operation time of each relay, to be sure that no degradation as occurred. The operation times must be between the limits, mentioned in the specifications.

Incidentally, for the modules with diodes, a continuity test can be done by applying the continuity indicator's probes on the diode's terminals. If the continuity indicator lights up or makes a beep, this means the diode is good.

For the LED type modules, you must be sure that the corresponding coil's LED is turned on. For the coil's starting up, the LED in on, indicating the state of the relay's coils.

SMRB2 Latching relays**8. TROUBLESHOOTING****8.1 NECESSARY MATERIAL**

<u>Generation</u>	<u>Range</u>	<u>Precision</u>	<u>Stability</u>	<u>Other</u>
Auxiliary Power Supply	105-141V	---	---	1 A

<u>Measuring apparatus</u>	<u>Range</u>	<u>Precision</u>	<u>Stability</u>	<u>Other</u>
Chronometer	0.1-100ms	0.1ms/1%	1%	

Multimeter (diodes checking device)

Other equipment
Continuity indicator

8.2 PROCEDURES

Due to the limited number of part susceptible of not functioning, it will be easier, in a case of a non functional SMRB2 module, to isolate and repair the problem following the troubleshooting flowchart on the next page.

SMRB2 Latching relays

8.3 FLOWCHART

RELAYS AND CONTACTS TEST SEQUENCE

