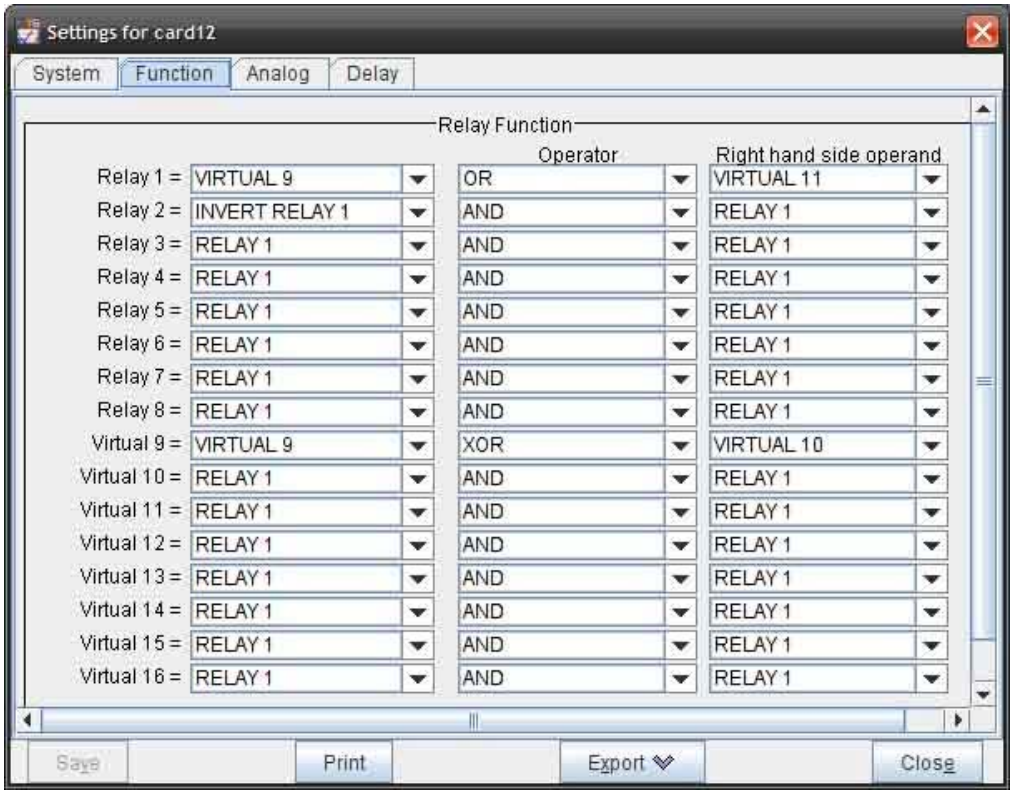
PRD/REL
Din Rail Output Card

Relay Function Programming

INDEX



1 INTRODUCTION

Integrated into the Din rail relay output card, from version 5.00 (August 2007) onwards, are several new features;

- 8 (additional) 'virtual' relay outputs (numbered 9 to 16, giving a total of 16 addressable relays),
- 2 (additional) 'virtual' analogue outputs (numbered 3 and 4, giving a total of 4 addressable analogues),
- Programmable logic functions for all relay outputs,
- Programmable functions for all analogue outputs,
- Programmable output delays for 'virtual' relay outputs

To distinguish the relay outputs cards that have these features from previous units, the cards appear to Pressnet and the controller cards as RELAY/8+ cards.

All of the additional configuration features of the relay output card are only available through the Pressnet software.

NOTE: the outputs used as arguments for functions can only be from the same card.

2 'VIRTUAL' RELAYS

The 'virtual' relays on the relay output card appear to the user as relay points, but are not externally accessible. The main purpose of the 'virtual' relays is for use in programming logic functions.

3 'VIRTUAL' ANALOGUES

The 'virtual' analogues on the relay output card appear to the user as analogue points, but are not externally accessible. The main purpose of the 'virtual' analogues is for use in programming functions.

4 RELAY LOGIC FUNCTIONS

The relay logic functions provide the ability to generate relay outputs by combining other relay outputs using logic functions. Most of these logic functions require 2 relay outputs as input arguments.

When programming logic functions, care should be taken to avoid 'circular references', this is where a function uses the output of another function which in turn uses the output of the first function. This situation can result in relays changing state rapidly.

4.1 AND

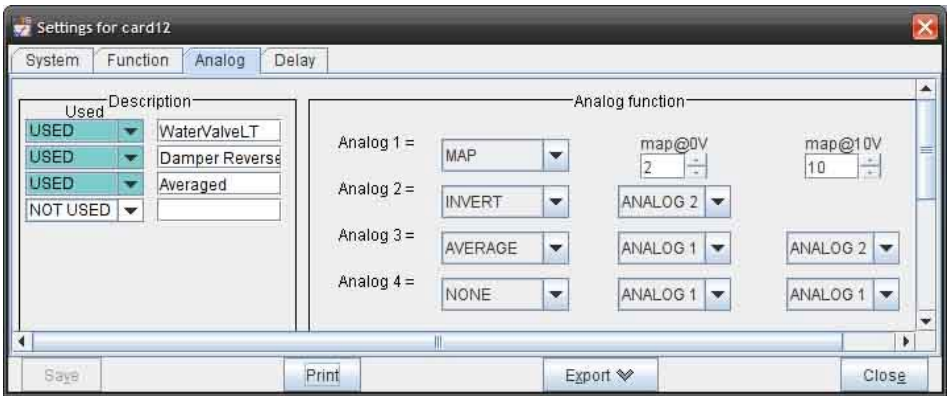
The AND logic function will turn a relay output ON if both of the argument relays are ON.

Arg1	Off	Off	On	On
Arg2	Off	On	Off	On
Output	**Off**	**Off**	**Off**	**On**

Table 1: AND logic

4.2 OR

The OR logic function will turn a relay output ON if either of the argument relays are ON.



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Arg1	Off	Off	On	On
Arg2	Off	On	Off	On
Output	**Off**	**On**	**On**	**On**

Table 2: OR logic

4.3 NAND

The NAND logic function gives the inverse of the AND logic function (Not AND). This function will turn a relay output OFF if both of the argument relays are ON.

Arg1	Off	Off	On	On
Arg2	Off	On	Off	On
Output	**On**	**On**	**On**	**Off**

Table 3: NAND logic

4.4 NOR

The NOR logic function gives the inverse of the OR logic function (Not OR). This function will turn a relay output OFF if either of the argument relays are ON.

Arg1	Off	Off	On	On
Arg2	Off	On	Off	On
Output	**On**	**Off**	**Off**	**off**

Table 4: NOR logic

4.5 XOR

The XOR logic function will turn a relay output ON if only one of the argument relays is ON (eXclusive OR).

Arg1	Off	Off	On	On
Arg2	Off	On	Off	On
Output	**Off**	**On**	**On**	**Off**

Table 5: XOR logic

4.6 INVERT

The INVERT function only requires one argument. This function will turn a relay output OFF if the argument relay is ON.

Arg1	Off	On
Output	**On**	**Off**

Table 6: INVERT logic

4.7 COPY

The COPY function only requires one argument. This function will turn a relay output ON if the argument relay is ON.

Arg1	Off	On
Output	**Off**	**On**

Table 7: COPY logic

5 ANALOGUE FUNCTIONS

The analogue functions provide the ability to generate analogue outputs by combining other analogue outputs, relay outputs, or remapping the analogue signal range. Most of the functions require 2 analogue outputs as input arguments.

5.1 MAP

The MAP function provides a way to remap the analogue signal to a different range. This function requires two numbers as arguments, the first number is the voltage which should appear at the output when 0V is selected. The second number is the voltage which should appear at the output when 10V is selected.

Examples of the MAP function are included in the example section of this sheet.

5.2 HIGHEST

The HIGHEST function will output the highest of the two argument analogue outputs.

5.3 LOWEST

The LOWEST function will output the lowest of the two argument analogue outputs.

5.4 AVERAGE

The AVERAGE function will output the average of the two argument analogue outputs.

5.5 INVERT

The INVERT function only requires one argument. This function will output the inverse of the argument analogue output. The inverse for an analogue is 10V minus the analogue. For example, if the argument analogue voltage was 7V, the inverse would be 3V.

5.6 COPY

The COPY function only requires one argument. This function will output a copy of the argument analogue output.

5.7 AND

The AND function requires one analogue output argument, and one relay output argument. This function will output a copy of the argument analogue output only if the relay output is ON. If the relay output is OFF, the analogue output will be 0V.

5.8 0V

The 0V function requires no arguments. This function will drive 0V on the analogue output.

5.9 10V

The 10V function requires no arguments. This function will drive 10V on the analogue output.

5.10 SELECT

The SELECT function requires one selection combination argument, and one relay output argument. This function will output a copy one of 2 analogue outputs selected by a relay output. If the relay is OFF the first analogue will be output, if the relay is ON the other analogue will be output.

	Relay State	
Arg1	Off	On
A1/A2	**A1**	**A2**
A1/A3	**A1**	**A3**
A1/A4	**A1**	**A4**
A2/A3	**A2**	**A3**
A2/A4	**A2**	**A4**
A3/A4	**A3**	**A4**

Table 8: SELECT logic

If one of the analogue values is the current analogue location, the “raw” analogue value is used as the output.

An example of the SELECT function is included in the example section of this sheet.

5.11 MAP A1

The MAP A1 function is almost exactly the same as the MAP function, except that the "raw" analogue signal to be remapped is taken from analogue 1.

5.12 MAP A2

The MAP A2 function is almost exactly the same as the MAP function, except that the "raw" analogue signal to be remapped is taken from analogue 2.

5.13 MAP A3

The MAP A3 function is almost exactly the same as the MAP function, except that the "raw" analogue signal to be remapped is taken from analogue 3.

5.14 MAP A4

The MAP A4 function is almost exactly the same as the MAP function, except that the "raw" analogue signal to be remapped is taken from analogue 4.

5.15 FUNCTION 1…3

Functions 1 to 3 are reserved for future additional programming functions. Selecting these functions may have unpredictable results.

6 OUTPUT DELAYS

The 'virtual' relay outputs can be programmed to be delayed for up to 990 seconds (in 10 second intervals). **NOTE: when using delayed outputs, signals of 10 seconds duration or less may be ignored.**

7 EXAMPLES

7.1 MAP FUNCTION

The following examples demonstrate how the MAP function can be used.

Example 1: Variable Speed Drive fan always on – if a VSD fan should always be operating, the range of the analogue output can be shifted so that the output range is 2V (first argument) to 10V (second argument). Refer to figure 1.

Example 2: Invert and limit signal – if an analogue signal should be inverted and limited to the range 5V (first argument) to 0V (second argument). Refer to figure 2.

7.2 COMPLEX FUNCTION

The following example demonstrates how the SELECT and MAP A1…4 functions can be used.

Example 3: On Peak/Off Peak switching – if the output should be mapped to two different ranges depending on whether off-peak or on-peak operation, like range 0V to 6V off-peak and 0V to 8V on-peak., and relay 1 indicates the peak state. The configuration for this is shown in Table 9: Example 3 configuration.

Output	Function	Arg1	Arg2
A1	SELECT	A2/A3	RLY 1
A2	MAP	0V	6V
A3	MAP A2	0V	8V

Table 9: Example 3 configuration

8 SOFTWARE REVISION

Relay cards with functions and 'virtual' outputs (Relay/8+) start at software version 5.00 (August 2007), and will work with SYSCON 1.50, MRACK 1.20, AIRCON 1.30 and Pressnet 1.6.2 or later.

The SELECT, MAP A1, MAP A2, MAP A3, and MAP A4 analogue functions are available on version 5.10 (and later) and Pressnet 1.6.6 or later

To identify software version of the card, view the site information tree in Pressnet which shows the software version beside the card type and network address number.

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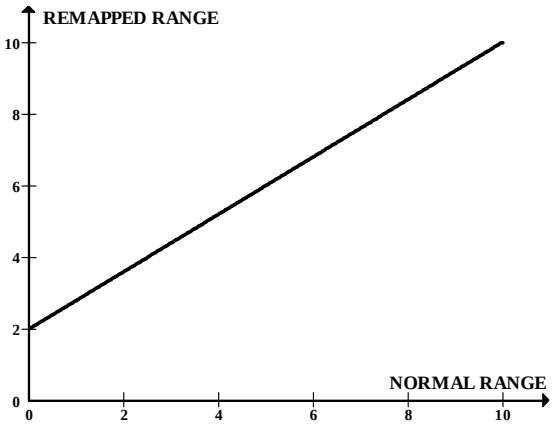

Figure 1: Analogue MAP example 1

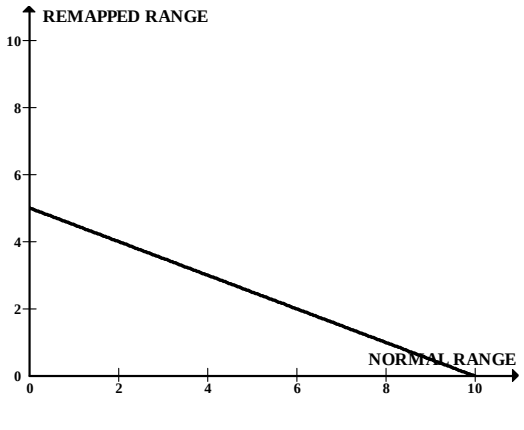

Figure 2: Analogue MAP example 2