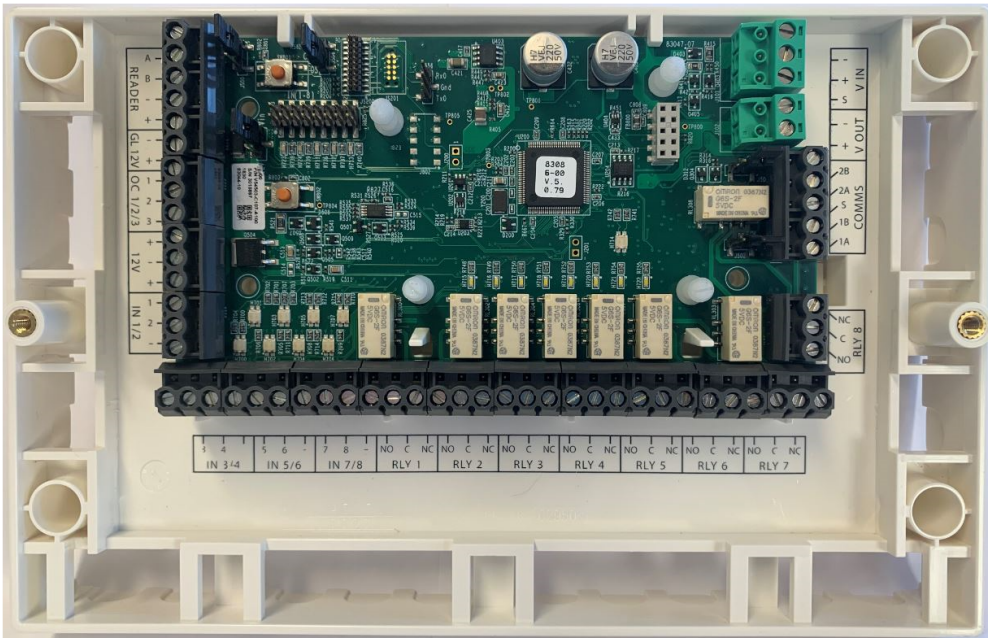
Multi Function Interface (MFI)

Technical Manual



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Hereby, Vanderbilt International (IRL) Ltd declares that this equipment type is in compliance with the following EU Directives for CE marking:

- Directive 2014/30/EU (Electromagnetic Compatibility Directive)
- Directive 2011/65/EU (Restriction of the use of certain hazardous substances Directive)

The full text of the EU declaration of conformity is available at: http://van.fyi?Link=DoC

Table of Contents

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1 General Information

1.1 Safety

Read the general safety precautions before installing/configuring/operating the device.

- Follow all warnings and instructions marked on the device.
- Keep this document for reference purposes.
- Please take into account any additional country-specific, local laws, safety standards or regulations concerning installation, operation and disposal of the product.
- Refer to a qualified electrician for installation.

1.2 Details of ordering

Type	Item Number	Description
MFI	V54502-C164-A100	MFI -SiPass Multi-Function Interface

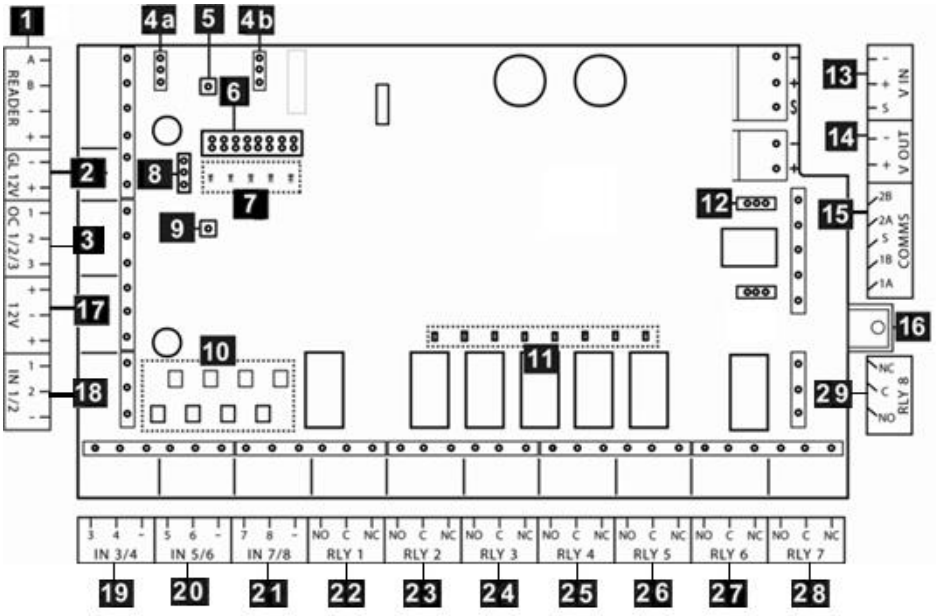
1.3 Product Description

The MFI is a Multi-Function Interface module that can be configured as reader interface or IO (input and output) module. It provides an interface between an (ACC AP) and up to eight OSDP readers and four doors.

1.4 Technical Specifications

Electrical	
Power Supply	● 20 - 29 V DC ● 1Vpp ripple
Power Consumption	116 mA @ 24V DC: No relays activated, and no inputs connected to MFI. 183 mA @ 24V DC: All relays active, inputs double balanced. 193 mA @ 24V DC: All relays active, inputs current loop.
Inputs	Up to 8 Monitored inputs are used for Door position sensor inputs and REX inputs with MFI configured in Door Controller mode. These 8 inputs can be used as general input points with MFI configured in input-output controller mode.
Relay outputs	8 relay outputs, max 30 V DC , 2A
Open Collector Outputs	3 Open Collector Outputs, Max load 0.5A
Reader Connections	Supports maximum up to 8 OSDP Readers with OSDP V1 and OSDP V2 encryption.
Power output	**12V DC, max 500mA protected by firmware controlled e-fuse** Can be used to connect readers or any other load, but restricted to 500mA overall current output. **24V DC, max 1500mA protected by firmware controlled e-fuse** Can be used to connect readers or any other load, but restricted to 1500mA overall current output. **24V DC, max current restricted by MFI power supply capability** Can be used for powering door locks. However, it is not suggested for powering readers as there is no firmware controlled fuse to detect over current draw.
Temperature range	- 40 C to +55 C
Dimensions (W × H × D)	239 × 156 × 53 mm
Weight	630 grams
Tamper switch	Opening tamper switch and removal tamper switch
Environmental class	II, IEC 60839 -11-1

1.5 Multi-Function Interface Module



1.6 Description of Numbered Items in the Diagram

Item Number	Description
1	**OSDP Card reader port:** RS485 communication + 12V output . **To source power from this port to the readers, a jumper setting is required.** **(Refer item 8 in this table)**
2	**12V, 200mA output** Can be used for any load.
3	**OC 1, 2, 3 - Open Collector Outputs.** Can be used to connect any custom load, that is, either powered from MFI board or powered externally. **(Refer Section 9 Addendum)**
4a	Enable/disable EOL for Reader communication port (J500). Jumper on the two upper pins – EOL ON.  Jumper on the two lower pins – EOL OFF. 
4b	**Reader type selector** Only OSDP protocol is supported by default (no jumper required).
5	**Opening tamper switch** Detects if the lid is removed.
6	Not used

1.6 Description of Numbered Items in the Diagram

Item Number	Description
7	**Status LEDs** ● Yellow: E – fuse 12 V ● Red: Error ● Orange: Communication ● Yellow: E- fuse V OUT ● Green: Power **Refer section 6.4 LEDs for a complete list of LED functional assignments.**
8	**Reader power selector (J501)** READER + will be 12V if the jumper is placed over the two lower pins. This selection will limit the reader current to 500mA shared with 12V port. **(Refer item 17 in this table)**  READER + will be same as V IN if the jumper is placed over the two upper pins. This selection will limit the reader current to 1500mA , if V IN is 24V. 1500mA current with this selection will be shared with load on 12V port **(Refer item 17 in this table)** and load on V OUT port **(Refer item 14 in this table).** 
9	**Reset button** Factory reset.
10	**Input LEDs** Indicates the status of the inputs.
11	**Output LEDs** Light up when the output relays are active.
12	Master communication FLN port (RS485 port 2 – 2A & 2B) EOL enable/disable jumper (J503)  - EOL enabled condition
13	**Voltage input** V IN – Power supply 24 V DC +/- 10% 1Vpp ripple
14	**V OUT** An electronically fused power output that follows V IN. Max current delivery - 1.5A. Current on this output is shared with READER power output port.
15	**Master COMMS FLN port** RS485 bus Connection to ACC AP - 2A and 2B is used for FLN communication. Note: 1A, 1B not used.
16	**Removal tamper** Detects if the MFI is removed from the wall, provided that the screw is mounted.
17	12V output, max 500mA - shared with the reader when the power supply of 12V is used. **(Refer item 8 in this table).**
18 - 21	**Input Channels** IN 1, 3, 5, 7 - Request to exit input (REX) IN 2, 4, 6, 8 - Door contact
22 - 29	**Relay outputs** RLY 1, 2, 3, 4 - Door lock / strike relay driven output RLY 5, 6, 7, 8 - Auxiliary Relay Outputs

1.7 Scope Of Delivery

1 x MFI board with required resisters and jumpers.
1 x installation manual English.

2 Installation

2.1 Installation

Required tools & material

- Medium-duty drill and associated drill-bits
- 4 mounting screws or standoffs (approx. 4 mm)
- Flat-blade terminal screwdriver
- Wire cutters
- Cable strippers

Expected installation time

30 minutes

Mounting instructions

1. Remove the MFI from its carton and discard the packaging material.
2. Place the MFI against the surface to which it is to be affixed and mark the location of the mounting holes. We recommend mounting the MFI within a cabinet.
   It is recommended that you affix the MFI at all four of the mounting locations provided.

⚠ WARNING

Type and source of hazard

Do not apply power to the MFI or associated components at this stage.

3. Select the appropriate drill bit according to the mounting surface / hole size and drill the holes in the locations marked (if required).
4. Connect the cabling to the MFI PCB. **Refer Section 6: Connections and LEDs**. Open the top cover before connecting cables and close after connections done.
5. Apply power to the MFI and test its operation. This step may require installation and programming of the access control host software and download of the firmware instruction set. Alternatively, the firmware and configuration may be carried out using the FLN Field Service Tool Version 2.5.3 or later.

2.2 Connections and LEDs

2.2.1 Connections related to Doorset

It is recommended that you wear a grounding strap while carrying out this procedure.

1. Connect **OSDP readers** to the appropriate READER port of MFI. Up to 8 OSDP readers can be connected.

Each reader must be wired correctly. **Refer Section 2.2.2 OSDP Reader wiring.** The total resistance for each reader cable must not exceed 16.8 Ohms.

2. If required, connect the **Request to Exit (REX) switch** (e.g. door opener button) to the appropriate REX input on the MFI.
3. If required, connect each **door contact** (door monitor) to the appropriate D/C input port on the MFI. For example, connect the contact for Door 1.

Resistors must be connected to the wiring for each input device (this applies to all inputs), if they are to be monitored. **Refer Section 2.2.3 Wiring of monitored input**.

The total cable run resistance must not exceed 100 Ohms.

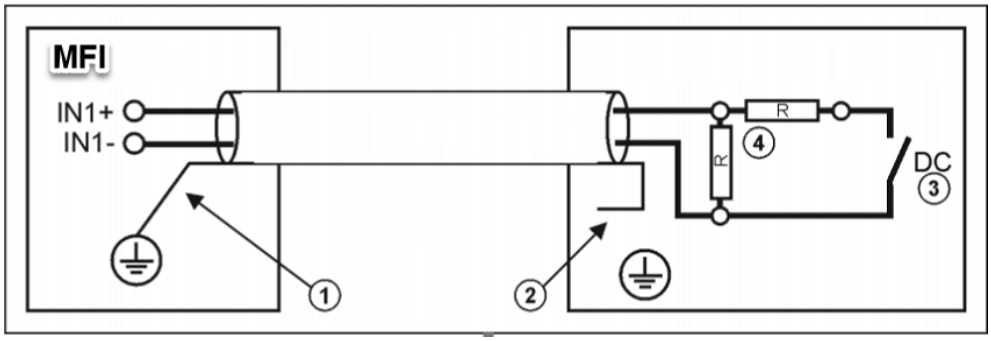
4. Connect each **door lock** to the appropriate RELAY OUT port on the MFI. Access doors can only be connected to output relays that are controlled by readers. (RELAY number 1-4)
5. For example, connect the **lock** for door 1 to the “RELAY1 OUT” connection on the MFI. Ensure that the power supply used to drive the lock is sufficiently rated.
6. Connect any auxiliary output devices to the **AUX OUT ports** (RELAY number 5-8) on the MFI.
7. Connect any load device to the Open Collector output if required.
8. Connect the **FLN wires** (from the ACC-AP) to the FLN RS485 (COMM 2A and 2B) port of MFI.
9. Connect the **Power Supply Unit** (PSU) to the **V IN** port. Ensure the polarity of the connection is made correctly.
10. Check all **jumpers**.
11. Check all connections thoroughly, including the polarity of each connection. Once you have verified all connections power can be applied to the MFI.

2.2.2 OSDP Reader wiring

Reader connection via OSDP with or without encryption. The readers should be connected to the appropriate terminal blocks (A, B, -, +) of the READER port Mapping from MFI board to the Reader ports.
Up to 8 OSDP readers can be daisy chained (from one reader to another) on the same connection.

Labels on MFI board	**A**	**B**	**-**	**+**
Labels on the Reader ports (HID, Vanderbilt Readers)	GPIO 1 A	GPIO 2 B	GND -	+VDC +

2.2.3 Wiring of monitored input



1. Connect the shielding to the housing earth.
2. Insulate the shielding at the input (e.g. door contact), do not connect it.
3. DC: door contact
4. R: terminating resistors each 22 kOhm

2.2.4 LEDs

LED function		**Name on the board**	**Color of LED**
RLY 1	Status LEDs Indicates activated/deactivated	H715	White
RLY 2		H716	White
RLY 3		H717	White
RLY 4		H718	White
AUX OUT 1		H719	White
AUX OUT 2		H720	White
AUX OUT 3		H721	White
AUX OUT 4		H722	White
INPUT status LEDs		H700 to H707	Red (During tamper) Green (Normal) Orange (Alarm)

2.2.4 LEDs

FLN Comm status LED The LED flashes to indicate communication between ACC-AP and MFI.	H712	Orange
Power status LED	H713	Green
Firmware status LED LED blinking quickly: Firmware must be downloaded (device running bootloader). LED blinking slowly (approx. once per sec): Indicates that firmware is already downloaded	H711	Green
Unassigned LED	H712	

2.3 Configuration and Firmware download

The **MFI** is configured using SiPass Configuration client, through the **ACC-AP AP01P**, or using the **ACC and FLN Field Service Tool**. Refer to the *Controller and Device Installation Guide* for more Information.

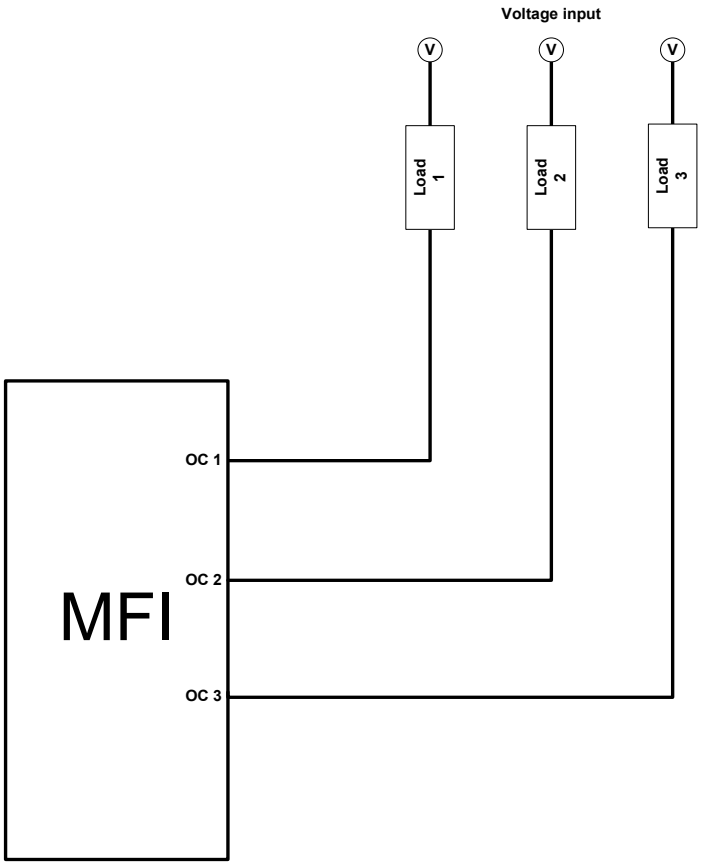
2.4 Cable Specifications

Communication Type	Recommended Cable Specifications								
	Cores	Pairs	AWG	Cores	J-Y(St)Y Diameter (mm)	Wire Type	Insulation	Shield	Jacket
RS-485	4	2	28	7 x 36	0.6	Tinned Copper	Foam Polyethylene	Aluminium foil - Polyester tape / braided shield	PVC
	6	3							
	8	4							
	6	3							
	8	4							
	6	3							
	8	4							
	8	4	24	7 x 32	0.6	Tinned Copper			
	8	4	24	7 x 32	0.6	Tinned Copper			
Power (12/24 V DC)	2	1	18	19 x 30	1.0	Tinned Copper	Foam Polyethylene	Unshielded	PVC

2.5 Addendum

(A)Using OC outputs of MFI

MFI's open collector outputs can be used as depicted below:



OC 1, OC 2, OC 3 points will be grounded, if they are activated from MFI to trigger current flow through the load(s).

External power or one of MFI's power output ports can be used for powering load on OC points. This implies that the following options are available for driving load on OC points.

- MFI 12V output
- MFI GL12V output
- MFI VOUT output
- External power

If MFI power output ports are used to power load on OCs, overall current usage shall not exceed the limits (discussed in section 3.1) for each of the output port, considering other loads that needs to be connected such as readers, door latches and so on.

(B)EOL terminations

EOL resisters shall be enabled on MFI's and AP's if the cable length exceeds 20 meters.

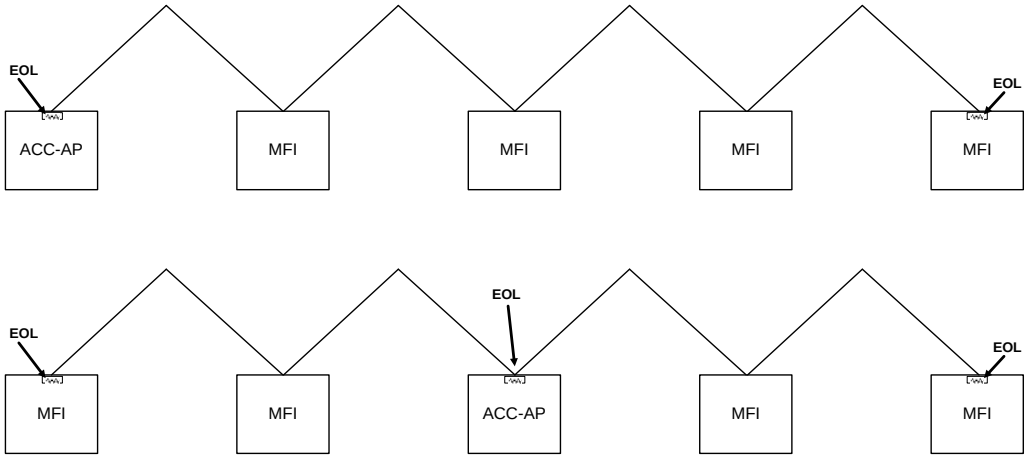
To enable EOL on MFI's ACC-AP connection port **(Refer section 3.1 Description of Numbered Items in the Diagram - Item Number 12)**

To enable EOL on MFI's reader connection port **(Refer section 3.1 Description of Numbered Items in the Diagram - Item Number 4a)**

To enable EOL on ACC-AP's MFI communication port **(Refer ACC-AP Technical Manual)**

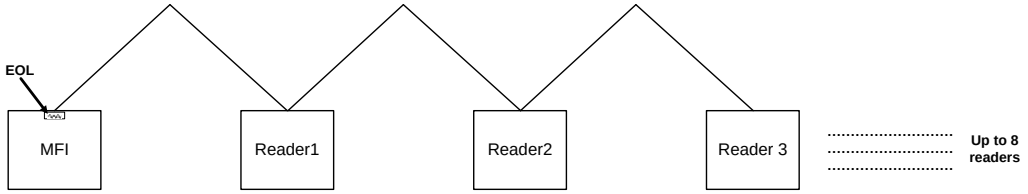
With multiple MFIs connected to ACC-AP, EOL must be enabled on ACC-AP and at the last MFI (on the line), if overall cable length between ACC-AP and last MFI exceeds 20m.

Sample wiring between ACC-AP and MFIs:



With readers connected to MFI, EOL resister must be enabled on MFI if cable length exceeds 20m.

Sample wiring between MFI and readers:



Note: If Vanderbilt NGCR Readers like VR40S-MF, VR10S-MF are used - EOL must always be enabled on MFI.

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