REFERENCE MANUAL

> SC4000
ID NET™ Controller

ODATALOGIC

✛DATALOGIC

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SC4000 ID-NET™ Controller Reference Manual

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CONTENTS

REFERENCES

CONVENTIONS

This manual uses the following conventions:

"User" refers to anyone using a SC4000 ID-NET™ controller.
"Controller" refers to the SC4000 ID-NET™ controller.
"You" refers to the System Administrator or Technical Support person using this manual to install, configure, operate, maintain or troubleshoot a SC4000 ID-NET™ controller.

REFERENCE DOCUMENTATION

For further details refer to the SC4000 Help On Line, Host Interface Module Installation Manual, and specific Scanner Reference Manuals provided as supplementary documentation on the downloadable Genius mini-DVD file.

SUPPORT THROUGH THE WEBSITE

Datalogic provides several services as well as technical support through its website. Log on to **www.datalogic.com** and click on the **SUPPORT** > **Unattended Scanning Systems** category link. From this page you can select your product model from the dropdown list which gives you access to:

- Downloads including Data Sheets, Manuals, Software & Utilities, and Drawings;

- Repair Program for On-Line Return Material Authorizations (RMAs) plus Repair Center contact information;

- Service Program containing details about Maintenance Agreements;

- Technical Support through email or phone.

COMPLIANCE

POWER SUPPLY

This product is intended to be installed by Qualified Personnel only.

This device is intended to be supplied by a UL Listed NEC Class 2 power source.

<table>
<tr><td>⚠️
CAUTION</td><td>*Total power consumption is given by adding the SC4000 power consumption to that of all the devices powered through the SC4000 (optional reading device, P.S., I/O). Refer to the manual of the connected devices for details about minimum/maximum supply voltage and power consumption.*</td></tr>
</table>

Each SC4000 supports only 1 optional reading device on the 25-pin connector + system accessories.

CE COMPLIANCE

CE marking states the compliance of the product with essential requirements listed in the applicable European directive. Since the directives and applicable standards are subject to continuous updates, and since Datalogic promptly adopts these updates, therefore the EU declaration of conformity is a living document. The EU declaration of conformity is available for competent authorities and customers through Datalogic commercial reference contacts. Since April 20th, 2016 the main European directives applicable to Datalogic products require inclusion of an adequate analysis and assessment of the risk(s). This evaluation was carried out in relation to the applicable points of the standards listed in the Declaration of Conformity. Datalogic products are mainly designed for integration purposes into more complex systems. For this reason it is under the responsibility of the system integrator to do a new risk assessment regarding the final installation.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC COMPLIANCE

Modifications or changes to this equipment without the expressed written approval of Datalogic could void the authority to use the equipment.

This device complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference which may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

EAC COMPLIANCE

Customs Union:
The CU Conformity certification has been achieved; this allows the Product to bear the Eurasian mark of conformity.

HANDLING

The SC4000 is designed to be used in an industrial environment and is built to withstand vibration and shock when correctly installed, however it is also a precision product and therefore before and during installation it must be handled correctly to avoid damage.

- avoid that the controller is dropped (exceeding shock limits).

- do not weld near the controller which can cause electrostatic, heat or display window damage.

- do not spray paint near the controller which can cause display window damage.

SC4000

Figure A

1. Indicator LEDs
2. Display 4x20 Characters
3. 3-Key Keypad
4. Host Interface Module Panel
5. Compression Connectors (5)
6. IP65 protection cover when not using 25-pin Optional Passthrough Device Connector
7. Cover Screws (4)
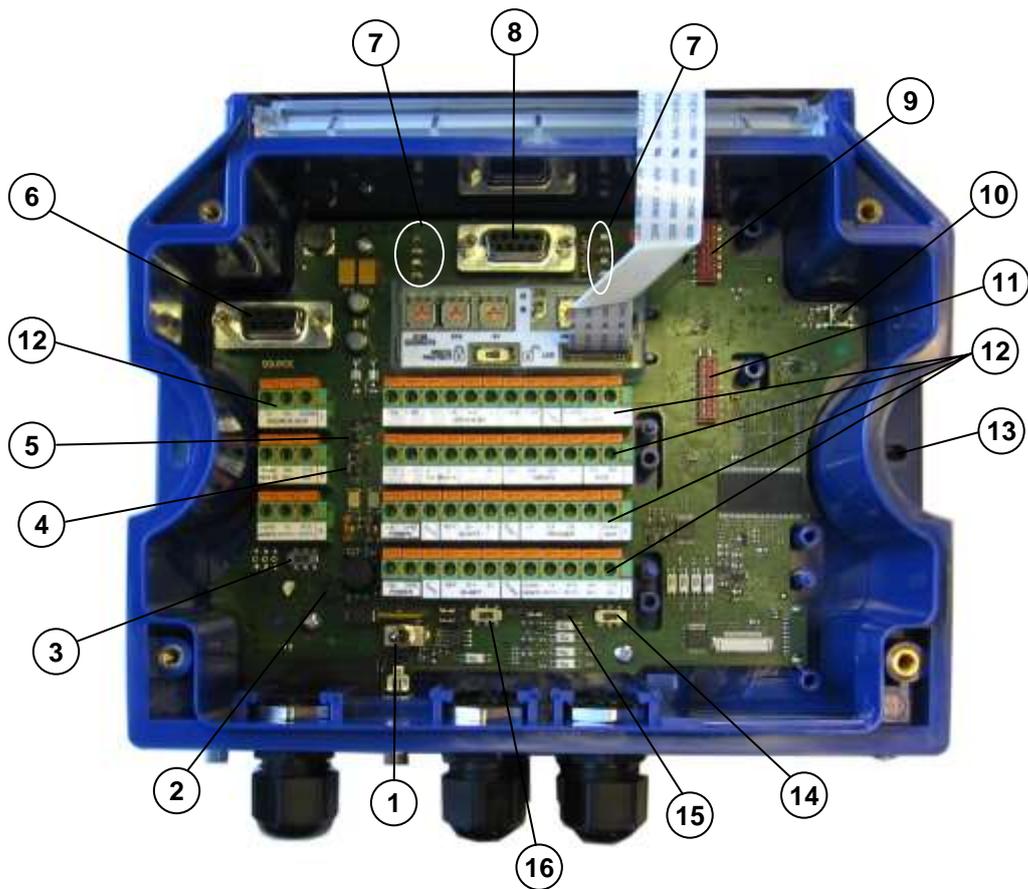
Figure B

1. Power Switch (ON/OFF)
2. Source Chassis Grounding Selector
3. Host 2 RS485 HD Termination Resistance
4. Host 2 Shield Selector
5. Power Source Selector
6. Data Source Port Connector
7. Indicator LEDs
8. Auxiliary Port Connector
9. IP65 Host Interface Module Connector
10. Reset Switch
11. Standard Host Interface Module Connector
12. Spring Clamp Terminal Blocks
13. Mounting Holes (2)
14. Host 1 RS485 HD Termination Resistance Switch
15. ID-NET/Host 1 Shield Selector
16. ID-NET Termination Resistance Switch

1 INTRODUCTION

1.1 PRODUCT DESCRIPTION

SC4000 is an industrial controller designed for high speed data collection in an ID-NET™ network of Datalogic's 1D/2D code readers.
SC4000 offers high communication performance and connectivity to the most common fieldbus systems by means of a complete range of optional Host Interface modules.

Performance
SC4000 data concentrator offers high communication performance, excellent connectivity and advanced software tools for monitoring and control of data collection networks. Up to 31 readers can be connected to satisfy the most demanding applications. Through SC4000, a multi-station reading system can be realized in a very simple way.
The SC4000 unit collects data, monitors the status of the ID-NET™ network and provides statistics.

Connectivity
A large number of communication interfaces are provided to satisfy all the most common demands. Three standard serial interfaces, always available, can be combined with a complete range of optional modules providing connectivity to standard Ethernet TCP/IP network or to the most common fieldbus systems.

Ease of Installation
Installation is simplified thanks to accessible through-holes for mounting screws with closed device. Optional adapters are available for fast fixing to Bosch profiles and DIN rail mounting. Moreover, the accessible spring clamps allow easy cabling operation.

Ease of Setup
SC4000 is easily programmed through Genius™, the multi-language SW configuration program that helps to automate and speed up the complete network configuration and calibration.

Ease of Maintenance
SC4000 allows complete monitoring of the network status, immediately providing useful information about performance and malfunctioning to users as well as to Datalogic WebSentinel™, the new surveillance software solution (available as an option) for the total remote control and monitoring of the readers.

WebSentinel™ collects data from the SC4000 network through the optional Ethernet TCP/IP host interface module, immediately providing useful information about performance and malfunctioning as intuitive visual onscreen data also accessible through the Internet network. WebSentinel™ allows remote data access through the most common Web browsers, as well as easy remote control, configuration and monitoring by means of the Genius™ pass-through feature.

Basic diagnostic and statistic information is directly available in multiple languages (English, French, German, Italian and Japanese) on the backlit 4-lines display, while intuitive LEDS provide indications about the status of the device as well as of the entire network.

When quick and reliable replacement is needed, SC4000 takes advantage of the embedded Backup & Restore module. This memory unit allows complete configuration and environmental parameter backup for SC4000 and all connected devices, granting secure and rapid replacement of any code reader in the ID-NET™ network.

Industrial Features
SC4000 features IP65 protection class and an operating temperature up to +50 °C (+122 °F).

Main Features
Some of the main features of this controller are given below:

- Industrial controller for high speed data collection from up to 31 reading stations

- ID-NET™ interface for data collection network

- Open architecture allows comfortable connectivity to Ethernet TCP/IP, Profibus, DeviceNet, Ethernet/IP and other common networks

- Complete network monitoring, statistics and diagnostics through WebSentinel™ software

- Multi-language Display and Keypad for easy network monitoring and diagnostics

- Embedded Backup and Restore feature to minimize plant downtime

- 10 to 30 VDC Power Supply

- Power, Communication and I/O LED indicators and convenient Power on/off switch

- Multi-language Genius™ SW tool allows rapid network configuration

- Device Programming: Windows-based SW (Genius™) via Serial or Ethernet link, Serial Host Mode Programming sequences

- Flexible mounting and simplified wiring to speed up the installation

- IP65 rated industrial design

Applications
SC4000 ID-NET™ controller has been developed for use in numerous industries like:

- Automated Warehousing

- Work-in-progress Control

- Product Traceability and Quality Control

1.2 ACCESSORIES

SC4000 can be equipped with optional accessories as follows:

Name	Description	Part Number
BM200/210	Ethernet TCP/IP Module STD/IP65	93ACC1851, 93ACC1852
BM300/310	Profibus Module STD/IP65	93ACC1810, 93ACC1811
BM400	DeviceNet Module IP65	93ACC1814
BM500/510/520	Ethernet/IP Module STD/IP65/IP54	93ACC1812, 93ACC1813, 93ACC1840
BM600	CANopen Module STD	93ACC1815
BM700/710	Profinet Module STD/IP65	93ACC1816, 93ACC1886
BM1100	CC-Link Module STD	93ACC1845
BM1200/1210	Modbus TCP STD/IP65	93ACC1848, 93ACC1849
BA100	DIN Rail Adapters	93ACC1821
BA200	Bosch Adapters	93ACC1822
BA300	M12 3P F Connector Panel (Service)	93ACC1877
BA400	M12 3P M Connector Panel (External Power)	93ACC1853
BA500	M12 4P F Connector Panel (Trigger)	93ACC1854
BA600	M12 5P F Connector Panel (ID-NET™ Out)	93ACC1855
BA700	M12 5P M Connector Panel (ID-NET™ In)	93ACC1856
BA900	Two Cable Glands Panel	93ACC1847

1.3 SUPPORTED READING DEVICES

The following reading devices can be connected as Slave nodes in an ID-NET™ network through a passive CBX100 connection box having SC4000 as the ID-NET™ Master.

ID-NET™	Linear Scanners				2D Readers	
Full-Speed	DS2100N	DS2400N	DS4800	DS5100	All Matrix x10 family	All Matrix x10N family
Fixed-Speed * (sw v. 6.80)	DS6x00	DX6400	DS8100A	DX8200A		

Any <u>serial device</u> (Hand-Held Reader, 6K, 8KA Scanner, etc.), can be connected through a CBX800 Gateway for Full-Speed ID-NET™ compatibility with SC4000. See the CBX800 Gateway Installation Manual for details.

> *For 6/8K family scanners having software version 6.80 or later, an alternative fixed speed (57600 baud) ID-NET™ layout can be made without the use of CBX800. See the ID-NET™ Application Note on* the downloadable Genius mini-DVD file *for details.*
>
> **NOTE**
>
> *For maximum ID-NET™ network performance use CBX800.*

2 INSTALLATION

2.1 PACKAGE CONTENTS

Verify that the SC4000 and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

❑ SC4000 ID-NET™ Controller with IP65 25-pin protection cover

❑ Quick Reference Guide

❑ Mounting screws and washers (2)
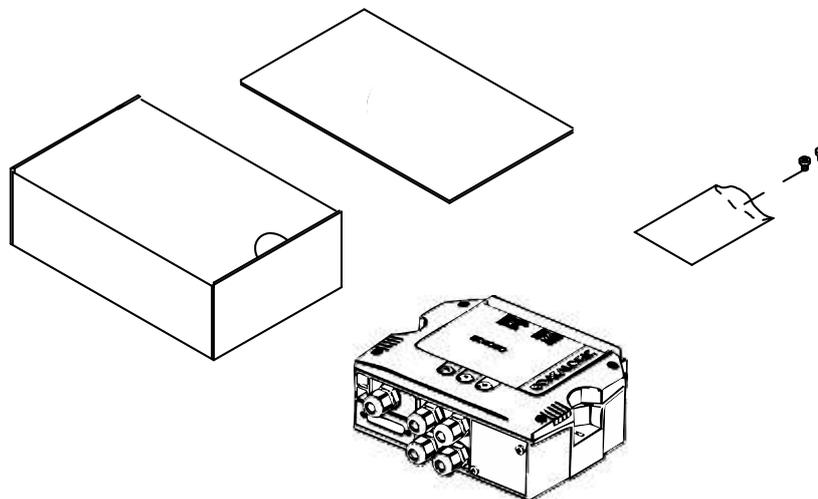
Figure 1 - Package Contents

2.2 OVERALL DIMENSIONS

The diagram below gives the overall dimensions of the SC4000 and shows the two mounting through-holes.
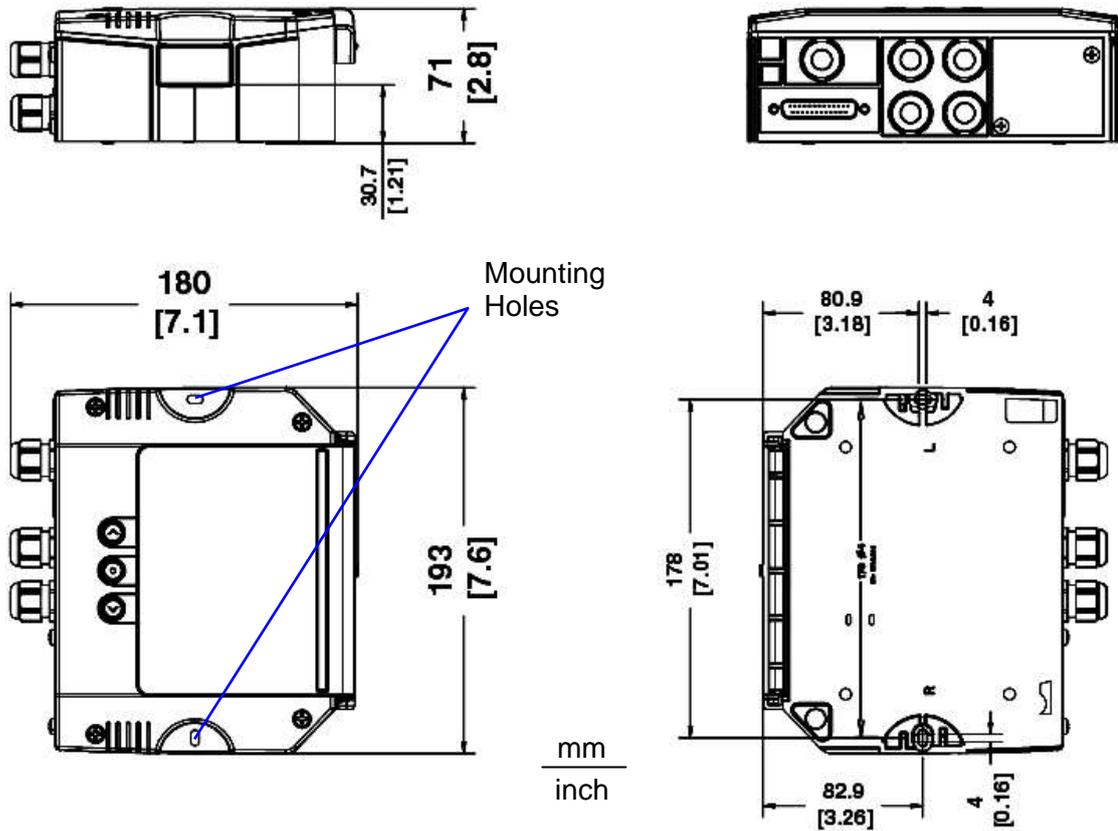
Figure 2 - Overall Dimensions

2.3 MECHANICAL INSTALLATION

SC4000 can be mounted to various wooden or plastic surfaces using two self-threading screws (3.9 x 45 mm) and washers.
Mounting to other surfaces such as concrete walls or metallic panels requires appropriate user-supplied parts (screws, screw anchors, nuts, etc).

SC4000 can also be mounted to a DIN rail or a Bosch Frame using the following mounting accessories: BA100 (93ACC1821), BA200 (93ACC1822).

2.4 OPENING THE SC4000

To install the SC4000 or during normal maintenance, it is necessary to open it by unscrewing the four cover screws:

⚠ CAUTION	*The SC4000 must be disconnected from the power supply during this operation.*
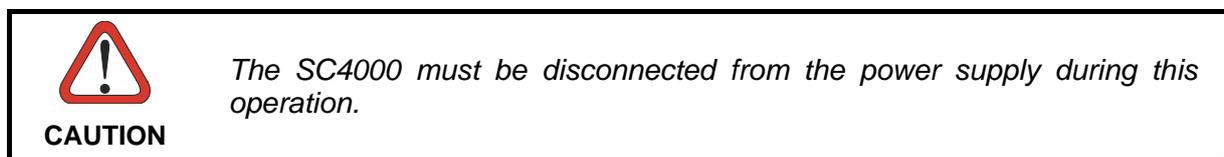
2.5 ACCESS TO INTERNAL PARTS

To make installation and replacement easier, the SC4000 is made up of three parts:

1) the body of the device containing all electronic components and optional boards

2) the transparent removable cover for inspection and for easy access to spring clamps and internal modules

3) the removable front connector panel providing easy access to the serial and optional interface modules
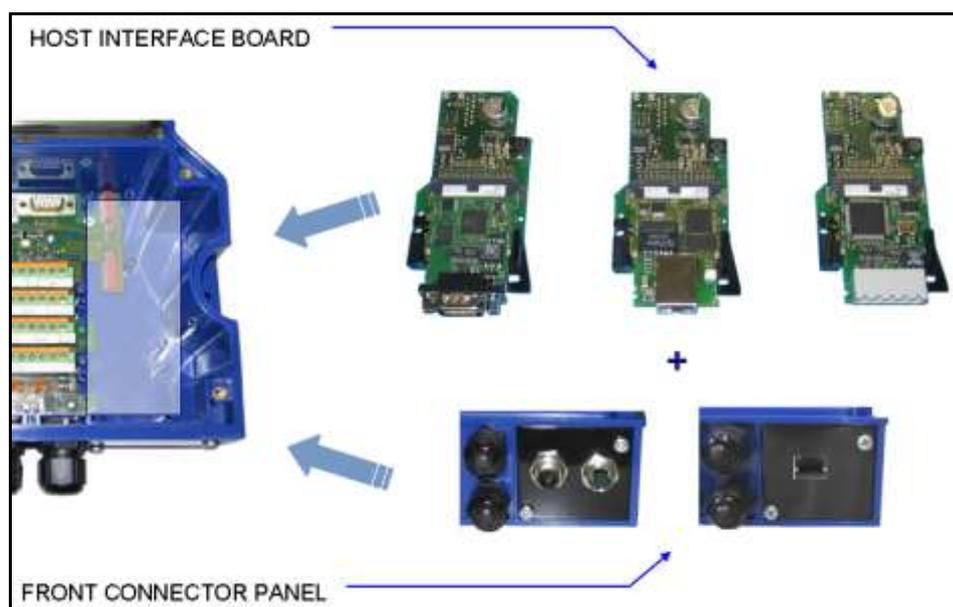
Figure 3 – SC4000 Front Connector Panel

3 PINOUT

Group	Name	Function		
Input Power	Vdc	Power Supply Input Voltage +		
	GND	Power Supply Input Voltage -		
	Earth	Protection Earth Ground		
External Trigger Input	+V	Power Source – External Trigger		
	I1A	External Trigger A (polarity insensitive)		
	I1B	External Trigger B (polarity insensitive)		
	-V	Power Reference – External Trigger		
Generic Input	+V	Power Source – Inputs		
	I2A	Input 2A (polarity insensitive)		
	I2B	Input 2B (polarity insensitive)		
	-V	Power Reference – Inputs		
Outputs	+V	Power Source – Outputs		
	-V	Power Reference – Outputs		
	O1+	Output 1+		
	O1-	Output 1-		
	O2+	Output 2+		
	O2-	Output 2-		
Other I/O	O3A	Output 3+ (polarity sensitive)		
	O3B	Output 3- (polarity sensitive)		
	+V	Power Source – Other I/O		
	I3A	Input 3A (polarity insensitive)		
	I4A	Input 4A (polarity insensitive) (to 25-pin connector only)		
	-V	Power Reference – Other I/O		
	I34B	Input 3B and 4B (common) (polarity insensitive)		
SC4000 Auxiliary Interface [1]	TX	Auxiliary Interface TX		
	RX	Auxiliary Interface RX		
	SGND	Auxiliary Interface Reference		
ID-NET™	REF	Network Reference		
	ID+	ID-NET™ network +		
	ID-	ID-NET™ network -		
Network	Shield	Network Cable Shield		
Data Source Auxiliary Interface [2]	TX	Data Source Aux TX		
	RX	Data Source Aux RX		
	SGND	Data Source Aux Reference		
Host 1 Interface [3]		**RS232**	**RS485FD**	**RS485HD**
		TX	TX+	RTX+
		RTS	TX-	RTX-
		RX	*RX+	
		CTS	*RX-	
		SGND	SGND	SGND
Host 2 Interface [4]		**RS232**	**RS485FD**	**RS485HD**
		TX	TX+	RTX+
		RTS	TX-	RTX-
		RX	*RX+	
		CTS	*RX-	
		SGND	SGND	SGND

* Do not leave floating, see Reading Device Reference Manual for connection details.

(1) The Auxiliary Interface group is connected to the 9-pin Auxiliary connector and is used for configuring the SC4000 parameters through Genius™, the multilanguage software tool.

(2) The Data Source Auxiliary group is connected to the 9-pin Data Source connector and is used for configuring the reading device parameters through Genius™, the multilanguage software tool.

(3) Host 1 Interface is for data transmission to Host.

(4) Host 2 Interface is for data transmission to Host or Data Source for additional reading device in Pass Through (e.g. Hand Held Reader).

The input power signals **Vdc**, **GND** and **Earth** as well as the network signals **REF**, **ID+**, **ID-** and **Shield**; and **RTX+**, **RTX-** and **SGND** are repeated to facilitate system cabling. In this way the power and network busses can enter and exit the SC4000 from different spring clamps but be physically connected together.

☝ **NOTE**	*To avoid electromagnetic interference:* - *Connect SC4000 Protection Earth (Earth) to a good earth ground.* - *Connect the reading device chassis to earth ground through the jumper, (default setting, see Figure 6).* - *Connect the Network Cable Shield (Shield) to Filtered Earth through the jumper (default setting, see Figure 7).*

⚠ **CAUTION**	*Do not connect to the Host 1 Interface spring clamp terminals if using Host Interface Modules (Fieldbus and non Fieldbus).*

4   JUMPER AND SWITCH SETTINGS

4.1   JUMPER SETTINGS

4.1.1   Power Source Jumper Settings

For most applications input power is provided by connecting to the dedicated spring clamp connectors inside the SC4000.

However SC4000 may accept power from the connected reading device through the 25-pin Data Source connector. This is useful, for example, to pass power to connected accessories such as Encoder and Presence Sensor from DX8200A VAC models or 6K/8K scanners powered directly through the network. See the relative reading device Reference Manual for details.

To power SC4000 from the data source, the power source jumper must be placed in the "power from device" position as indicated in Figure 4.
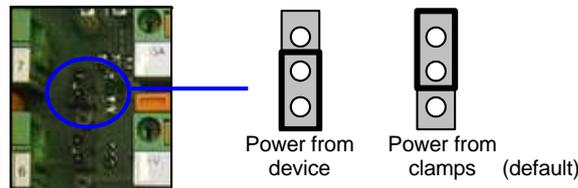
Figure 4 - Power Source Jumper Settings

4.1.2   Host 2 Shield Jumper Settings

The Host 2 Interface shield (Shield) can be connected to Earth Ground (Earth) either directly or through a filter circuit. If the jumper is left open, the network cable shield (Shield) is floating.
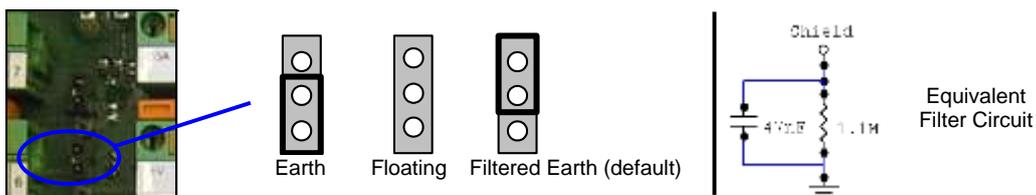
Figure 5 - Host 2 Shield Jumper Settings

4.1.3   Source Chassis Grounding Jumper Settings

The data source chassis grounding method can be selected by positioning a jumper (see Figure 6). In this way the reading device chassis can be connected to earth ground (only if pin Earth is connected to a good earth ground). For all reading devices except 6K/8K, the chassis can alternatively be connected to the power supply ground signal (GND) or it can be left floating but, in this case, the jumper must be removed. For 6K or 8K scanners the chassis is internally connected to GND.
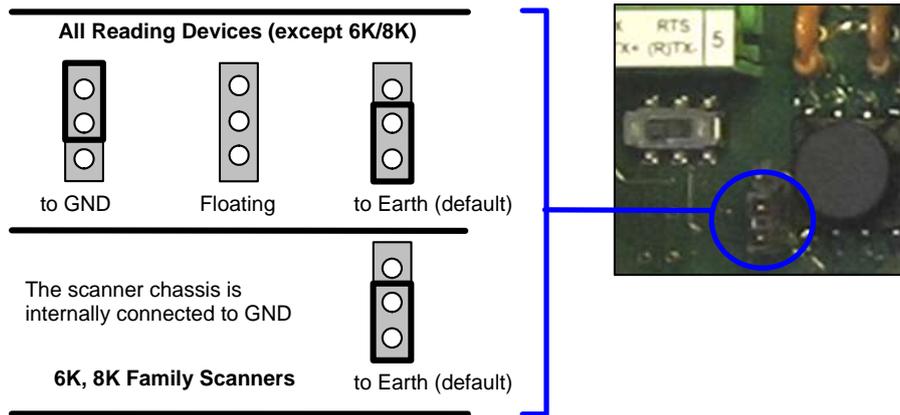
Figure 6 – Chassis Grounding

4.1.4   ID-NET/Host 1 Shield Jumper Settings

The Network shield (Shield) can be connected to Earth Ground (Earth) either directly or through a filter circuit. If the jumper is left open, the network cable shield (Shield) is floating.
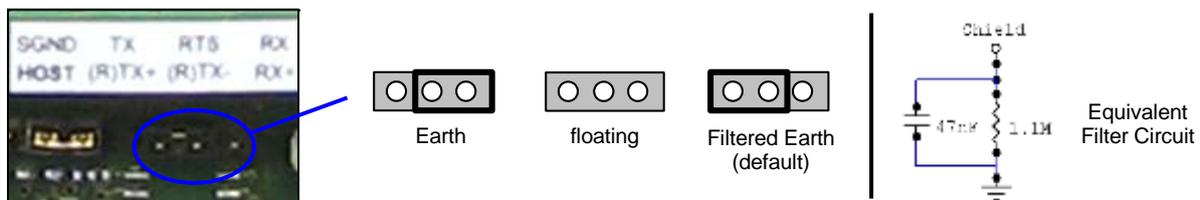
Figure 7 - ID-NET/Host 1 Shield Jumper Settings

4.2   NETWORK BUS TERMINATION

4.2.1   ID-NET™ Termination

Figure 8 – ID-NET™ Termination Resistance Switch

The ID-NET™ termination resistance switch enables or disables the insertion of the bus termination resistor for ID-NET™ network applications.

> ⚠ **CAUTION**
>
> *In ID-NET™ network applications the termination resistor must be enabled ONLY on the first and last devices of the chain. On all the other devices this resistor MUST NOT be enabled (OFF).*

4.2.2 Host 1 RS485 HD Termination
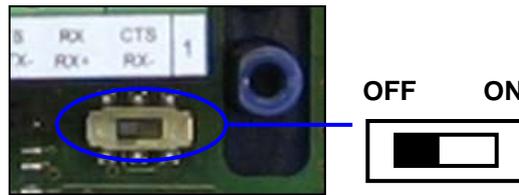
Figure 9 – Host 1 RS485 HD Termination Resistance Switch

The Host 1 RS485 HD termination resistance switch enables or disables the insertion of the bus termination resistor for RS485 Half Duplex Multidrop applications.

⚠️ **CAUTION**	*In Multiplexer applications the termination resistor must be enabled ONLY on the last device of the chain, the farthest away from the Multiplexer (assuming the Multiplexer is the first device of the chain). **On all the other devices this resistor MUST be OFF (disabled).*** *This switch must also be OFF (disabled) when Host Interface Modules are used.*

4.2.3 Host 2 RS485 HD Termination
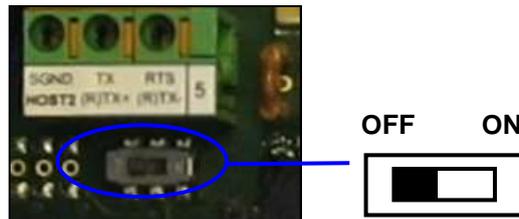
Figure 10 – Host 2 RS485 HD Termination Resistance Switch

The Host 2 RS485 HD termination resistance switch enables or disables the insertion of the bus termination resistor for RS485 Half Duplex Multidrop applications.

⚠️ **CAUTION**	*In Multiplexer applications the termination resistor must be enabled ONLY on the last device of the chain, the farthest away from the Multiplexer (assuming the Multiplexer is the first device of the chain). **On all the other devices this resistor MUST be OFF (disabled).*** *This switch must also be OFF (disabled) when Fieldbus Modules are used.*

4.3 NETWORK PARAMETER SELECTORS

The integrated backup and restore module provides four rotary switches which allow easy manual selection of network parameters.

As shown in Figure 11, the Net Type rotary switch allows Network Type selection, while three dedicated rotary switches (X1, X10, X100) can be used for manually selecting addressing (and for the special case of ID-NET™ Multidata Slave, Baudrate).

The backup and restore module also includes an additional slide switch which allows write protection for security purposes.
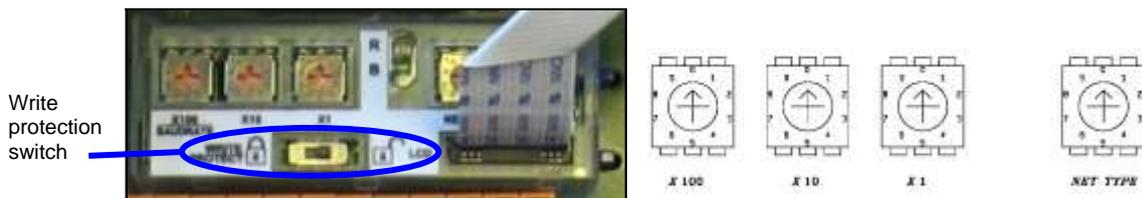
Figure 11 – Network Parameter Selectors

4.3.1 Network Type Selection

The network type depends on the application layout and installed accessories.

Net Type Switch
0 = None (no Host Interface Module present)
1 = Ethernet/IP
2 = Profibus
3 = DeviceNet
4 = CC-Link
5 = Profinet
6 = CANopen
7 = Software Configuration Controlled Host Interface Network
8 = Not Available
9 = ID-NET™ Slave Multidata

The Net Type selector switch allows setting the Host interface type to be connected to the SC4000 ID-NET™ Controller:

- When the SC4000 ID-NET™ Controller communicates with the Host through the main serial interface, or all other non network applications, the Net Type switch must be set to **None (0)**.

- Through the SC4000, several types of accessory Host Interface Modules are available to connect the SC4000 ID-NET Master to a Host network as a Slave node of that network. The Net Type switch settings **(1 - 6)** assign the Host network type through the hardware switch; the Node Address is assigned by the Network Address Selection switches. These settings override the software configuration and therefore when used, **must** match the actual Host Interface Module.

- The Net Type switch setting **Software Configuration Controlled Host Interface Network (7)** allows the Host network type and Node Address to be set through the software configuration program; the hardware switches are ignored. This position is valid

for all the Host network types including Module types that have no hardware switch position (i.e. Modbus TCP or Ethernet TCP/IP).

• In a special case, SC4000 can act as a gateway for an ID-NET™ Multidata Slave by setting the Net Type switch to **Slave Multidata (9)**. A separate unit acts as the ID-NET™ Multidata Master. See par. 4.3.3 and appendix A for details.

NOTE

ID-NET™ Slave Multidata (position 9) excludes Host Interface Module network configuration (Fieldbus and non-Fieldbus) which is reserved for the ID-NET™ Master. However, in addition to being sent on the ID-NET™ network, Slave data can also be sent to the Host 1 Serial interface.

4.3.2 Network Address Selection

Figure 12 – Address Selection Switches

Hardware network address selection is provided for rapid installation of the Host Interface Modules. These switch settings are read at each power-up or reset, and <u>override software configuration settings</u> except where specified otherwise. Valid address selection depends on the network type:

Ethernet/IP and Profinet
The Ethernet IP or Profinet address refers to the last three digits of the IP address (i.e. 172.16.11.xxx). The valid selection range is from 000 to 255. Address selections outside of this range are not accepted by the network.

IP Addressing
There are a few special switch settings that allow the software to determine the IP address for Ethernet IP and Profinet interfaces. These settings correspond to the *IP Addressing* parameter in Genius™.

777 = Remote Assignment through the IPConfig application available on the downloadable Genius mini-DVD file.
888 = Static Assignment – set manually through Genius™
999 = set through a DHCP server

Profibus
The valid selection range for the Profibus address is from 000 to 126. Address selections outside of this range are not accepted. Address 126 is a special address which allows the Profibus Master, through software, to set the node address in the range from 000 to 125.

DeviceNet
The valid selection range for the DeviceNet address is from 00 to 64. Address selections outside of this range are not accepted. The x100 switch is ignored. Address 64 is a special address which allows the DeviceNet Master, through software, to set the node address in the range from 00 to 63.

CC-Link

The valid selection range for the CC-Link address is from 01 to 64. Address selections outside of this range are not accepted. The x100 switch is ignored. See the Help On-Line *Node Address* parameter for address restrictions.

CANopen

The valid selection range for the CANopen address is from 001 to 128. Address selections outside of this range are not accepted. Address 128 is a special address which allows the CANopen Master, through software, to set address and baud rate.

ID-NET™

If acting as a gateway ID-NET™ Multidata Slave, the valid selection range for the ID-NET™ Slave addresses is from 01 to 31. Address selections outside of this range are not accepted by the ID-NET™ network. The x100 switch in this case refers to the ID-NET™ baudrate.

4.3.3 ID-NET™ Multidata Slave Baudrate Selection

The Host network baudrates (Fieldbus and non-Fieldbus) cannot be set through the baudrate switch.

In the special case where SC4000 is used as an ID-NET™ network Multidata Slave, the ID-NET™ Slave baudrate is selected through the baudrate switch (**x100**) and must match the ID-NET™ Master baudrate. The settings are:

ID-NET™ Baudrate Switch (x100)		
	0 = 19200 Baud	5 = 500 kBaud
	1 = 38400 Baud	6 = 1 MBaud
	2 = 57600 Baud	7 = Reserved
	3 = 125 kBaud	8 = Reserved
	4 = 250 kBaud	9 = Reserved

4.3.4 Write Protection Lock

Figure 13 – Write Protection

A write protection switch is provided to protect configuration data from being inadvertently overwritten. When this switch is in the lock position, the Backup function is not available (data cannot be written to the backup memory) and a diagnostic warning message will be shown on the display. The Restore function is available.

4.4 RESET SC4000 TO FACTORY DEFAULT (OPTIONAL)

If it ever becomes necessary to reset the SC4000 to the factory default values, you can perform this procedure by holding the Reset push button (Figure B, #10) pressed while powering up the SC4000.

Keep the button pressed until the end of the procedure (about 5-6 seconds), the Configuration and Environmental parameters are reset and the LEDs: TRIGGER, IN 2, and READY blink simultaneously 3 times.

On the SC4000 display module, the message "Default Set" is shown on the display.

5   ELECTRICAL CONNECTIONS

5.1   SYSTEM WIRING

The connection and wiring procedure for SC4000 is described as follows:

1) Open the SC4000 by unscrewing the four cover screws.

2) Verify that the SC4000 power switch is off (see Figure 15).

3) Unscrew the compression connectors and pass all the system cables through them into the SC4000 housing.

4) To connect the power and input/output signals:

- Prepare the individual wires of the system cables by stripping the insulation back approximately 1 cm.
- Using a device such as a screwdriver, push down on the lever directly next to the clamp (see Figure 14).
- Insert the wire into the clamp and release the lever.

   The wire will now be held in the spring clamp.

5) Tighten the compression connector nuts so that the internal glands seal around the cables.
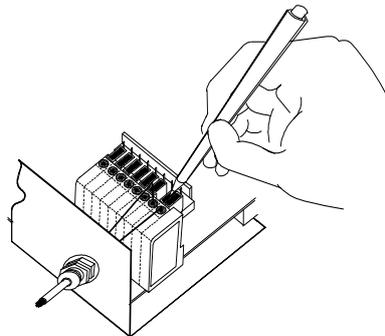

Figure 14 - System Cable Connections

Flexible stranded wire should be used and must meet the following specifications.

All positions: 24 - 16 AWG 0.2 - 1.5 mm²

The SC4000 spring clamp connector pinouts are indicated in this chapter and in the Pinout table in chapter 3.

5.2 POWER SUPPLY

Power is supplied to the SC4000 through the Vdc and GND pins provided on the spring clamp connector.

The power switch (see Figure 15) switches the power supply ON or OFF for both the SC4000 and any optional device powered through the 25-pin connector.

<table>
<tr>
<td>⚠️
CAUTION</td>
<td>The power switch does not control power to the Vdc/GND, +V/-V spring clamps, therefore any devices connected to these signals (i.e. external trigger, encoder, etc.), are live and are not protected from polarity inversion. Disconnect the power supply when working inside the SC4000.</td>
</tr>
</table>
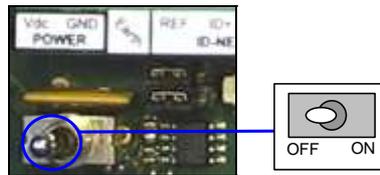
Figure 15 - Power Switch ON/OFF Positions
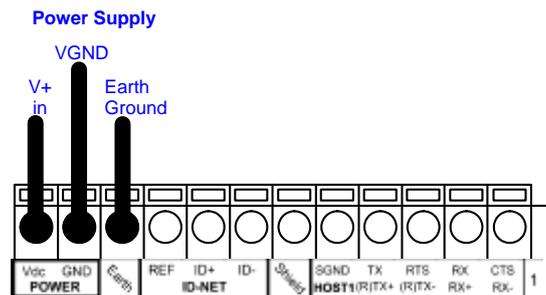
Figure 16 - Power Supply Connections

<table>
<tr>
<td>☝️
NOTE</td>
<td>Vdc is electrically connected to +V, just as GND is electrically connected to -V. This is useful for supplying external trigger, inputs and outputs from the SC4000 power source, however +V and -V signals should not be used as power supply inputs to the SC4000.</td>
</tr>
</table>

The power supply must be between 10 and 30 Vdc only.

In special cases SC4000 can alternatively accept power through the 25-pin connector (see par. 4.1.1 for jumper settings).

5.3 HOST INTERFACES

SC4000 offers two serial interfaces in order to meet any connectivity requirement:

- Host 1 Interface: RS232/RS485 software selectable and optoisolated for data transmission to Host.

- Host 2 Interface: RS232/RS485 software selectable for data transmission to Host or Data Source for additional reading device in Pass Through (for example a Hand Held Reader).

> ⚠️ *Do not connect to the Host 1 Interface spring clamp terminals if using Host Interface Modules (Fieldbus and non-Fieldbus) with the SC4000.*
>
> **CAUTION**

The signals relative to the following serial interface types are available on the SC4000 spring clamp terminal blocks.

The host serial interface types and their line parameters (baud rate, data bits, etc.) can be defined by the user via Genius™ software. The RS485 half duplex is automatically set whenever MUX32 communication protocol is enabled. For more details refer to the "Communication Settings" section in the Help On Line.

Details regarding the connections and use of the interfaces are given in the next paragraphs.

5.3.1 Host 1 Interface

RS232 Interface

The RS232 interface can be used for connection to the host computer to transmit code data.

The following pins are used for RS232 interface connection:

Pinout	Function
TX	Transmit Data
RX	Receive Data
RTS	Request To Send
CTS	Clear To Send
SGND	Signal Ground

It is always advisable to use shielded cables. The overall maximum cable length must be less than 15 m (49.2 ft).
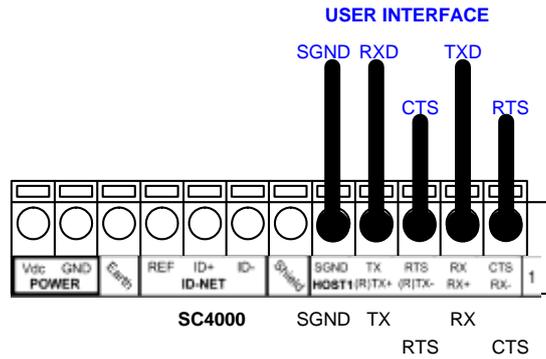
Figure 17 – RS232 Host Interface Connections Using Hardware Handshaking

The RTS and CTS signals control data transmission and synchronize the connected devices.
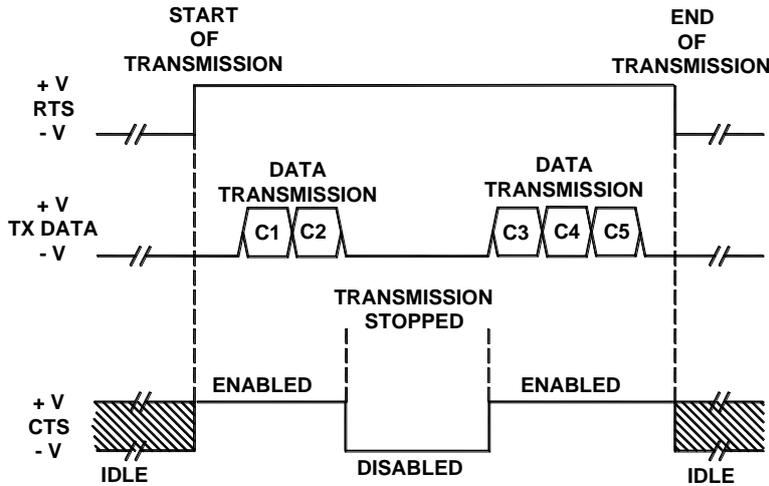
Figure 18 - RS232 Control Signals

If the RTS/CTS handshaking protocol is enabled, the SC4000 activates the RTS output to indicate a message is to be transmitted. The receiving unit activates the CTS input to enable the transmission.

RS485 Full-Duplex Interface

The RS485 full-duplex (5 wires + shield) interface is used for non-polled communication protocols in point-to-point connections over longer distances (max 1200 m / 3940 ft) than those acceptable for RS232 communications or in electrically noisy environments.

The pinout table follows:

Pinout	Function
TX+	RS485 Transmit Data +
RX+	RS485 Receive Data +
TX-	RS485 Transmit Data -
RX-	RS485 Receive Data -
SGND	Signal Ground
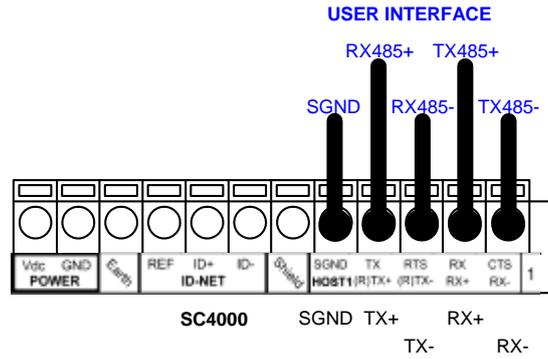
Figure 19 - RS485 Full-duplex Connections

> ☞ **NOTE**
>
> *For applications that do not use RX485 signals, do not leave these lines floating but connect them to SGND as shown below.*

Figure 20 - RS485 Full-duplex Connections using Only TX Signals

RS485 Half-Duplex Interface

The RS485 half-duplex (3 wires + shield) interface is used for polled communication protocols.

It can be used for Multidrop connections with a Datalogic MX4000 Multiplexer, exploiting a proprietary protocol based on polled mode called MUX32 protocol, where a master device polls slave devices to collect data.

Pinout	Function
RTX+	RS485 Receive/Transmit Data +
RTX-	RS485 Receive/Transmit Data -
SGND	Signal Ground
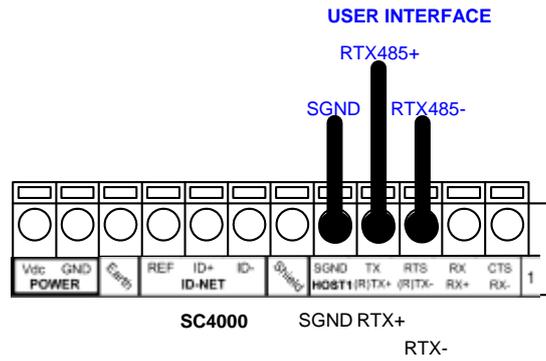
Figure 21 - RS485 Half-duplex Connections

This interface is forced by software when the protocol selected is MUX32 communication protocol.

In a Multiplexer layout, the Multidrop address must also be set via serial channel by the Genius™ utility or by the Host Programming Mode.

5.3.2   Host 2 Interface

The Host 2 port can be used for full RS232/RS485 connectivity to an alternative Host computer, It is software selectable and optoisolated.

RS232 Interface

The following pins are used for RS232 interface connections:

Pinout	Function
TX	Transmit Data
RX	Receive Data
RTS	Request To Send
CTS	Clear To Send
SGND	Signal Ground
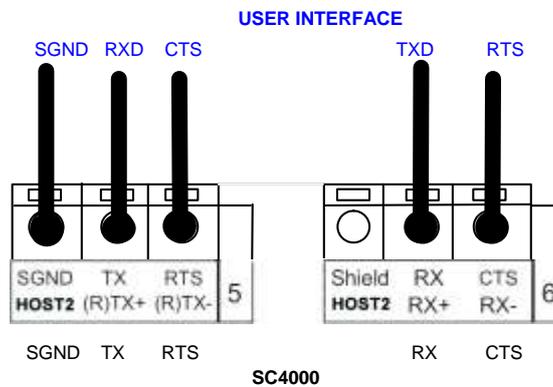
Figure 22 – RS232 Data Source Interface Connections

5

RS485 Full-Duplex Interface

The following pins are used for RS485 Full-duplex interface connections:

| Pinout	Function
TX+	RS485 Transmit Data +
RX+	RS485 Receive Data +
TX-	RS485 Transmit Data -
RX-	RS485 Receive Data -
SGND	Signal Ground
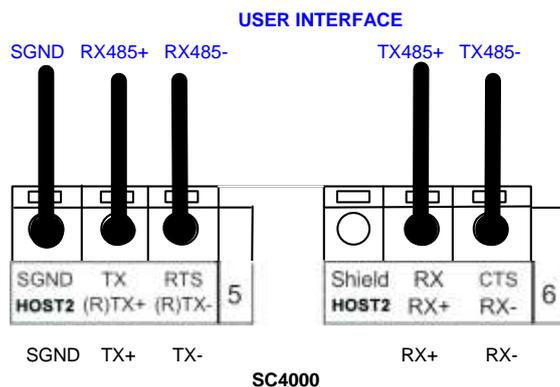
Figure 23 - RS485 Full-duplex Connections

NOTE

For applications that do not use RX485 signals, do not leave these lines floating but connect them to SGND as shown below.
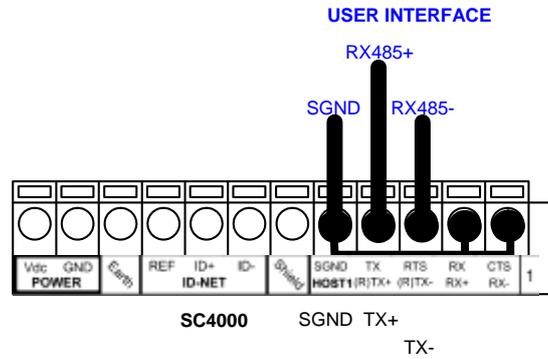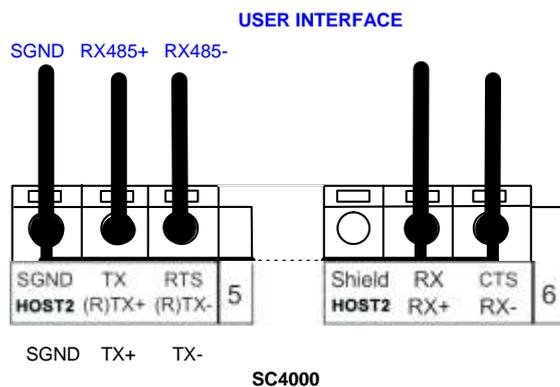

Figure 24 - RS485 Full-duplex Connections using Only TX Signals

RS485 Half-Duplex Interface

The following pins are used for RS485 Half-duplex interface connections:

Pinout	Function
RTX+	RS485 Receive/Transmit Data +
RTX-	RS485 Receive/Transmit Data -
SGND	Signal Ground
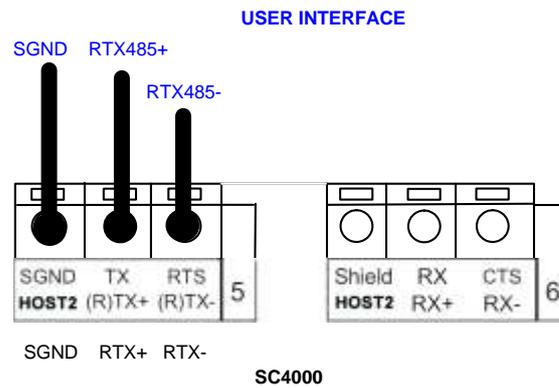
Figure 25 - RS485 Half-duplex Connections

5.4 ID-NET™ INTERFACE

SC4000 features an optoisolated ID-NET^{TM} high speed interface up to 1 Mbps (500 Kbps default).

The following pins are used for connection:

Pinout	Function
Shield	Network Cable Shield
ID+	ID-NET™ network +
ID-	ID-NET™ network -
REF	Network Reference

5.4.1 ID-NET™ Cables

The following instructions are referred to Figure 27, Figure 28 and Figure 29.

- The general cable type specifications are: CAT5 twisted pair + additional CAT5 twisted pair, shielded cable AWG 24 (or AWG 22) stranded flexible.

  <u>We recommend using</u> DeviceNet cables (drop or trunk type) to the following reference standards:

  AN50325 – IEC 62026

  UL STYLE 2502 80°C 30V

- Cable Shield MUST be connected to earth ground ONLY at the Master.

- NEVER use ID-NET™ cable shield as common reference.

- The ID-NET™ max cable length depends on the baudrate used, (see the Baudrate Table below).

- For Common Power Connections use only 2 wires (ID+ and ID-).
  - DC Voltage Power cable (Vdc – GND) should be handled as a signal cable (i.e. do not put it together with AC cable)
  - The ID-NET™ REF signal must be connected to the common power GND only at the Master (SC4000).
  - Wire dimensioning must be checked in order to avoid voltage drops greater than 0.8 Volts.
  - Cable should lie down as near as possible to the ID-NET™ cable (avoiding wide loops between them).

- Device's chassis may be connected to earth.

- Network inside the same building.

Baudrate Table			
Baud Rate	125 kbps	250 kbps	**500 kbps**	1Mbps
Cable Length	1200 m	900 m	**700 m**	*

* Application dependent, contact your Datalogic representative for details.

👆 **NOTE**	*The default ID-NET™ baudrate is 500 kbps. Lower ID-NET™ baudrates allow longer cable lengths. The baudrate is software configurable by authorized Datalogic personnel only.*

5.4.2   ID-NET™ Response Time

The following figure shows the response time of the ID-NET™ network. This time is defined as the period between the Trigger activation and the beginning of data transmission to the Host.

Max ID-NET™ Response Time
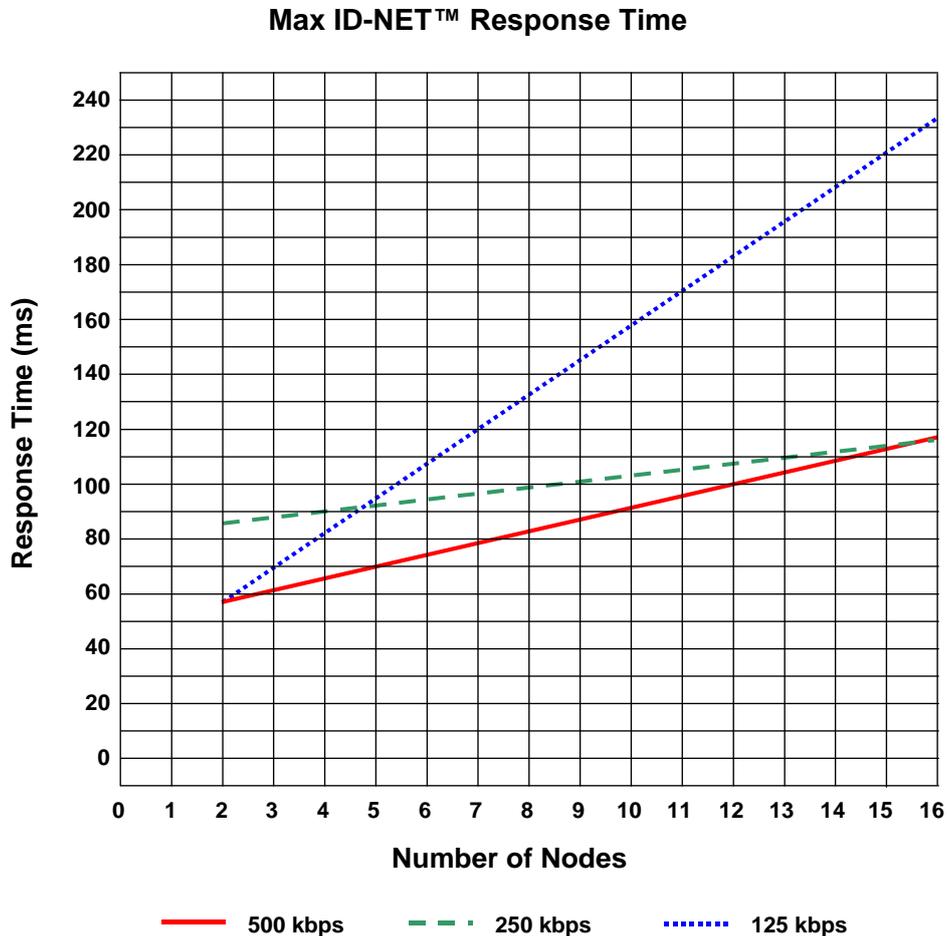
Figure 26 – ID-NET™ Response Time

CONDITIONS:

- ID-NET™ M/S Synchronized layout
- message length = 50 bytes per node

> *The network must be properly terminated in the first and last device of the network. This is done by setting the ID-NET™ Termination Resistance Switch in the SC4000 to ON.*
>
> **NOTE**
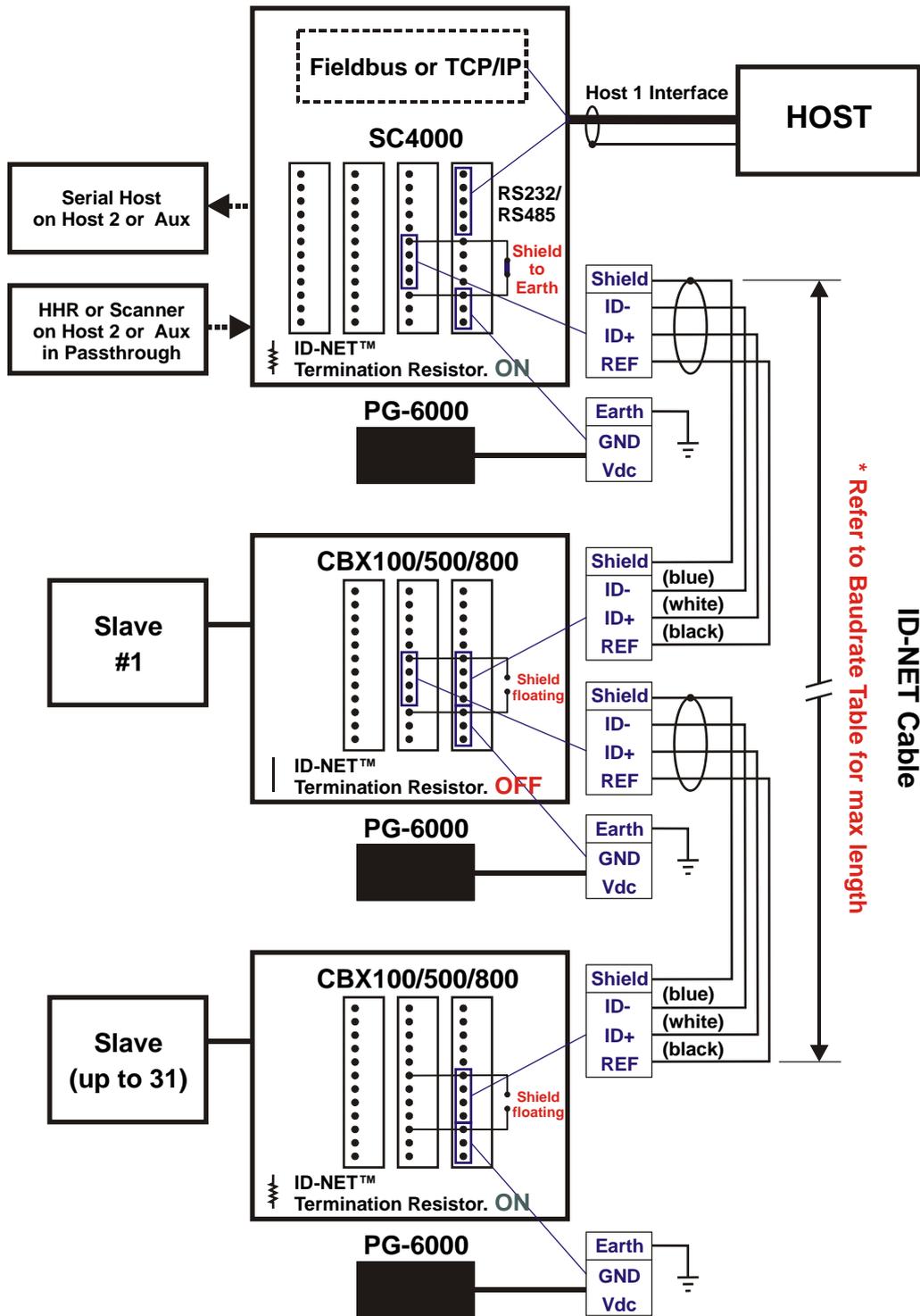
Figure 27 – ID-NET™ Network Connections with isolated power blocks
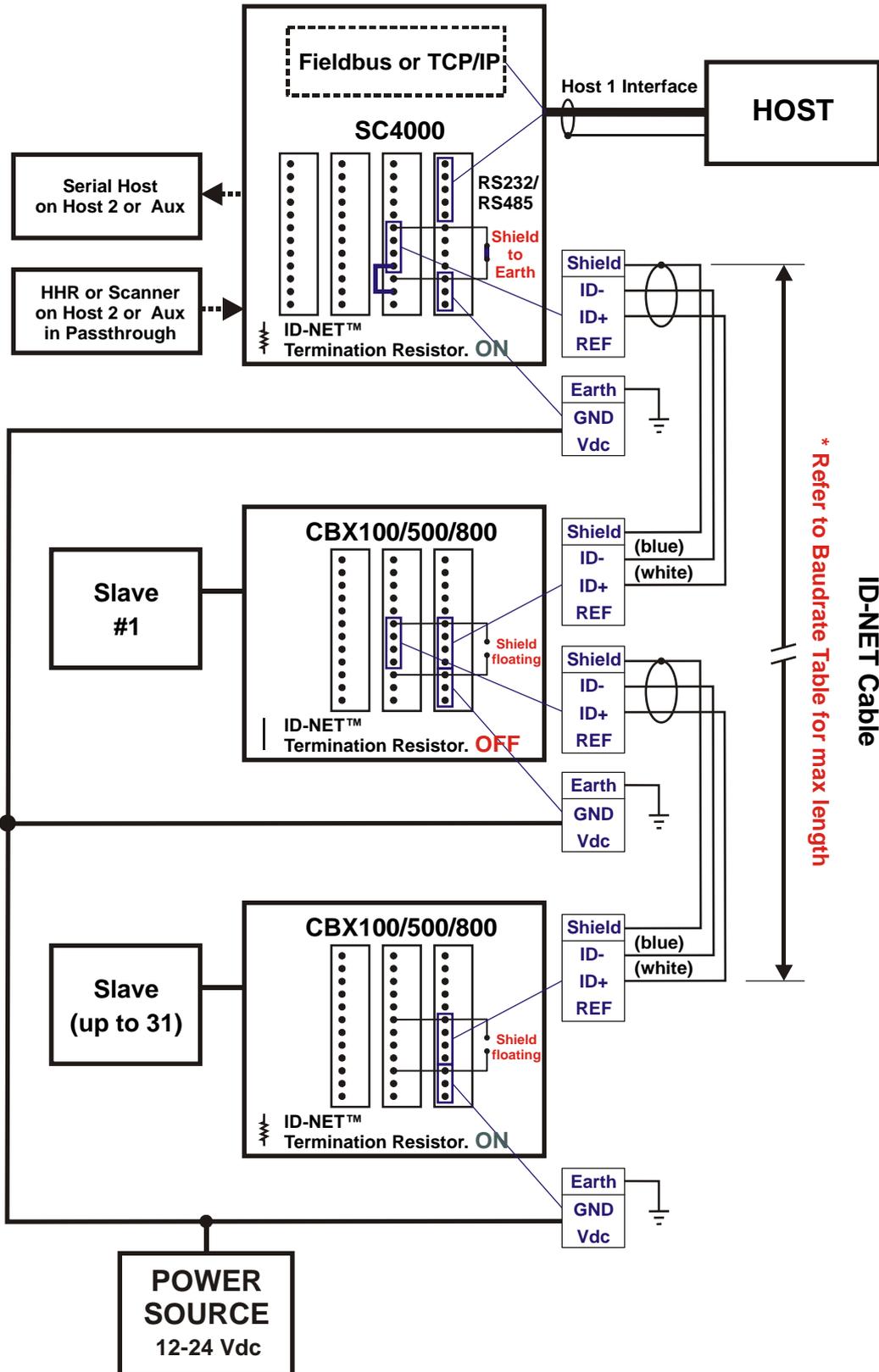
Figure 28 - ID-NET™ Network Connections with Common Power Branch Network
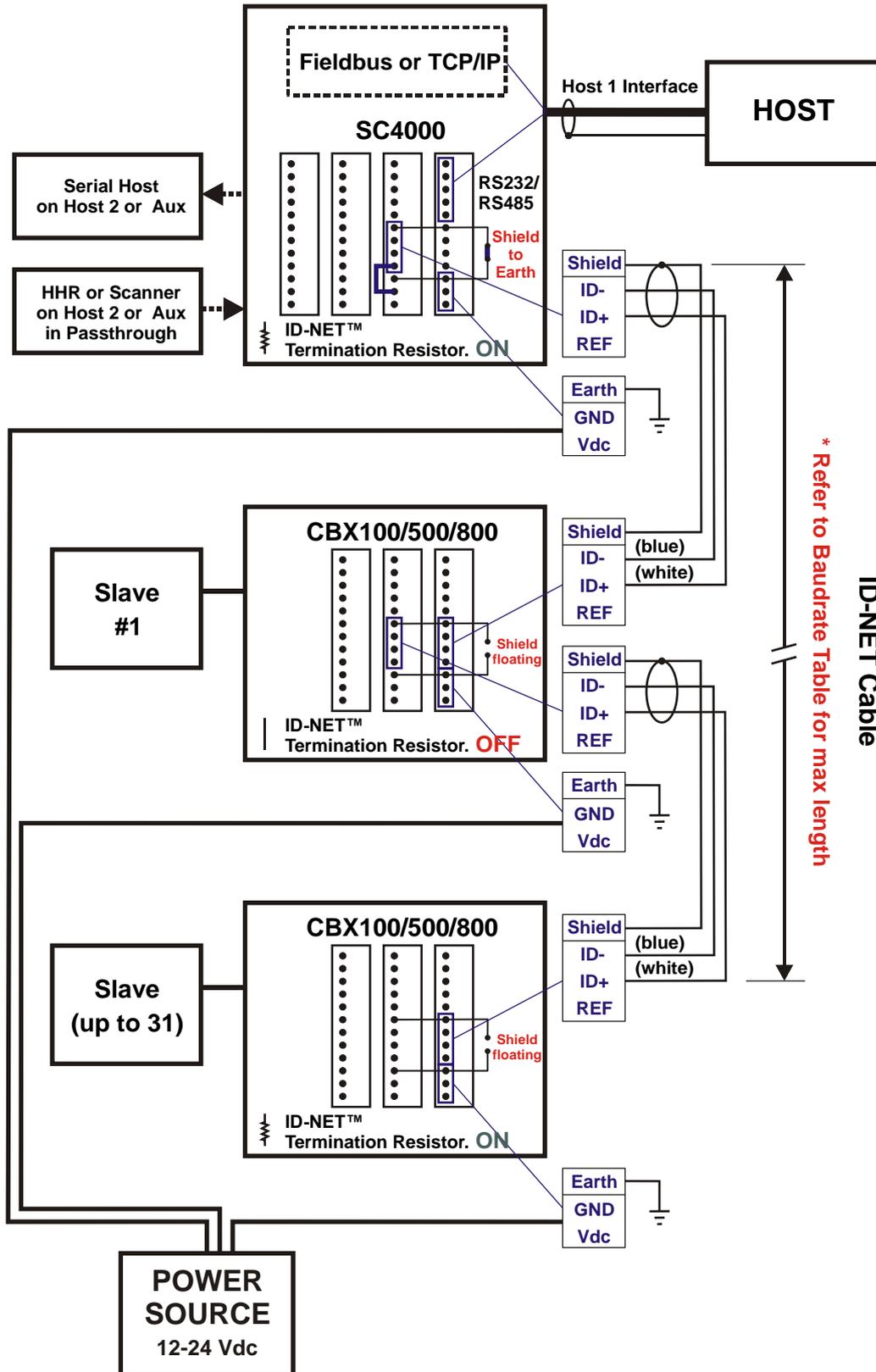
Figure 29 – ID-NET™ Network Connections with Common Power Star Network

5.5 SC4000 AUXILIARY INTERFACE

All SC4000s have an RS232 auxiliary interface available on the 9-pin connector below, which can be linked to another host computer or an external system. This interface is mainly used for SC4000 configuration through Genius™, the multilanguage software tool. Diagnostics and program downloading can be performed from this interface.

Connections can be made to a PC or Laptop using a straight through cable or a USB-RS232 converter.

Figure 30 - 9-pin D-Sub Female Connector

With reference to the 9-pin connector of Figure 30, the following pins are used to connect the RS232 auxiliary interface:

Pin	Name	Function
2	TX	Auxiliary Interface Receive Data
3	RX	Auxiliary Interface Transmit Data
5	SGND	Signal Ground
1, 4, 6, 7, 8, 9		N.C.
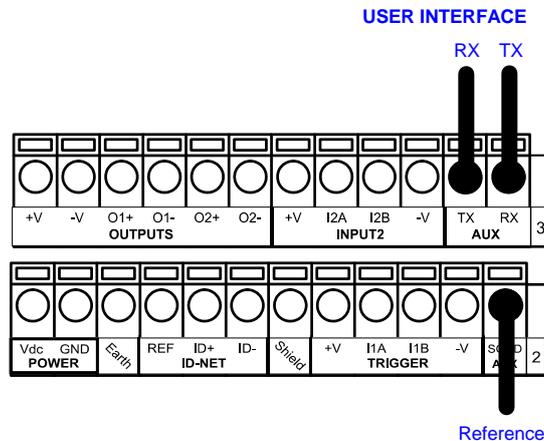
Figure 31 - RS232 Auxiliary Interface Connections

☞ *Do not connect the Aux Interface to the SC4000 spring clamp connectors and the 9-pin connector simultaneously.*

NOTE

5.6 DATA SOURCE AUXILIARY INTERFACE

The Data Source Auxiliary Interface available on the 9-pin connector below can be used for configuration through Genius™ of an optional external reading device connected through the 25-pin connector.

Figure 32 - 9-pin D-Sub Female Connector

With reference to the 9-pin connector of Figure 32, the following pins are used to connect the Data Source Auxiliary Interface:

Pin	Name	Function
2	TX	Data Source Aux Interface Receive Data
3	RX	Data Source Aux Interface Transmit Data
5	SGND	Signal Ground
1, 4, 6, 7, 8, 9		N.C.
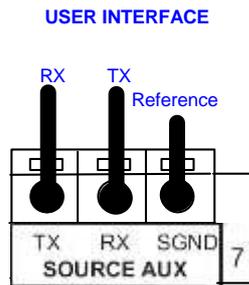
Figure 33 – Data Source Auxiliary Interface Connections

5.7 INPUTS

There are two optocoupled polarity insensitive inputs available on the SC4000: Input 1 (External Trigger Input) and Input 2, a generic input. These inputs are typically used when SC4000 is an ID-NET Master in a Synchronized network.

These inputs are optocoupled and can be driven by both NPN and PNP type commands.

NOTE

Polarity insensitive inputs assure full functionality even if pins A and B are exchanged.

5.7.1 External Trigger Input (Input 1)

The connections are indicated in the following diagram:

Pinout	Function
+V	Power Source - External Trigger
I1A	External Trigger A (polarity insensitive)
I1B	External Trigger B (polarity insensitive)
-V	Power Reference - External Trigger

EXTERNAL TRIGGER INPUT CONNECTIONS USING READING DEVICE POWER

CAUTION — *Power is available directly to the Input Device, independently from the Power Supply Switch inside the SC4000.*
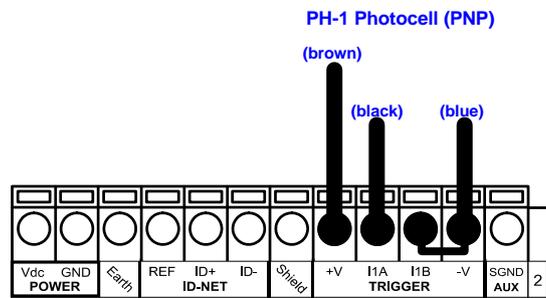
Figure 34 – PH-1 External Trigger Using SC4000 Power
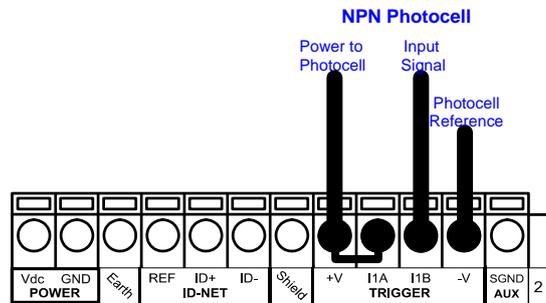
Figure 35 - NPN External Trigger Using SC4000 Power

EXTERNAL TRIGGER INPUT CONNECTIONS USING EXTERNAL POWER
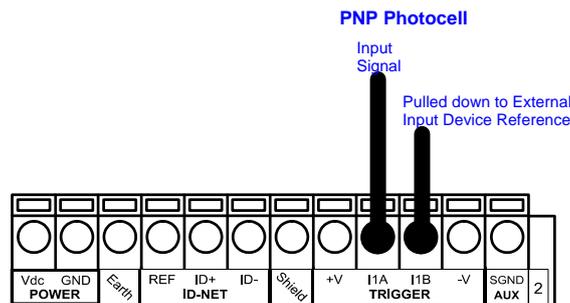
Figure 36 - PNP External Trigger Using External Power

NPN Photocell

Pulled up to External
Input Device Power

Input
Signal

Vdc GND Earth REF ID+ ID- Shield +V I1A I1B -V SGND
POWER   ID-NET   TRIGGER   AUX 2
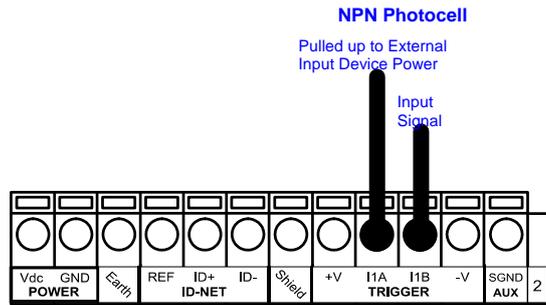
Figure 37 - NPN External Trigger Using External Power

5.7.2   Generic Input (Input 2)

Pinout	Function
+V	Power Source – Inputs
I2A	Input 2 A (polarity insensitive)
I2B	Input 2 B (polarity insensitive)
-V	Power Reference - Inputs

INPUT 2 CONNECTIONS USING READING DEVICE POWER

> ⚠️ **CAUTION**
> *Power is available directly to the Input Device, independently from the Power Supply Switch inside the SC4000.*

Input Device

Power to
Input Device

Input   Input Device
Signal   Reference

+V -V O1+ O1- O2+ O2- +V I2A I2B -V TX RX
     OUTPUTS   INPUT2   AUX 3

PNP Input 2 Using SC4000 Power

Input Device

Power to   Input
Input Device Signal

Input Device
Reference

+V -V O1+ O1- O2+ O2- +V I2A I2B -V TX RX
     OUTPUTS   INPUT2   AUX 3
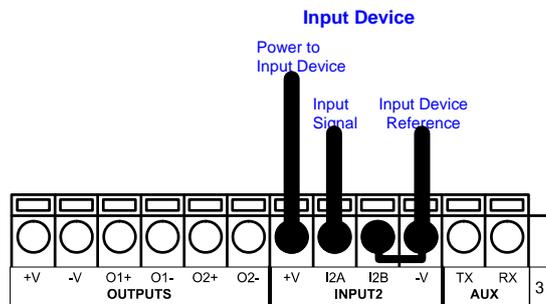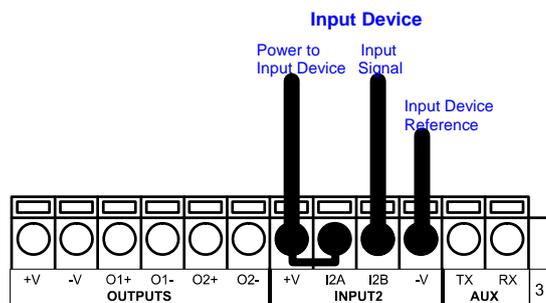
NPN Input 2 Using SC4000 Power

INPUT 2 CONNECTIONS USING EXTERNAL POWER
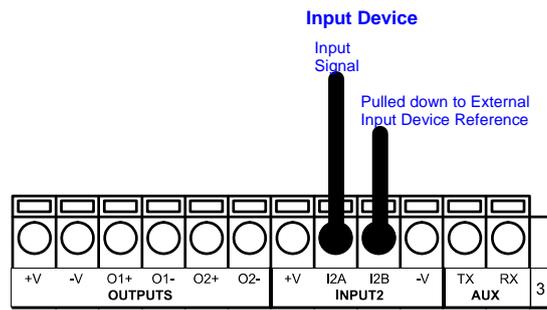
Figure 38 - PNP Input 2 Using External Power
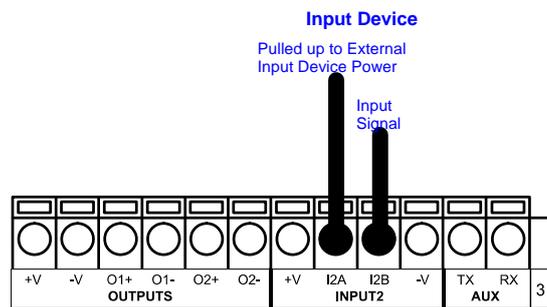
Figure 39 - NPN Input 2 Using External Power

5.8 OUTPUTS

Two optocoupled general purpose outputs are available. The meaning of the two outputs Output 1 and Output 2 can be defined by the user. These outputs are typically used when SC4000 is an ID-NET Master in a Synchronized network.

In this case they can be used to signal the data collection results.

The output signals are fully programmable and event driven.

Pinout	Function
+V	Power Source - Outputs
O1+	Output 1 +
O1-	Output 1 -
O2+	Output 2 +
O2-	Output 2 -
-V	Power Reference Outputs

OUTPUT CONNECTIONS USING READING DEVICE POWER

⚠️ **CAUTION** | *Power is available directly to the Output Device, independently from the Power Supply Switch inside the SC4000.*
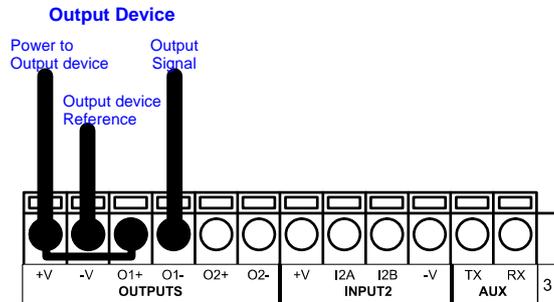
**Figure 40 - Open Emitter Output Using SC4000 Power**
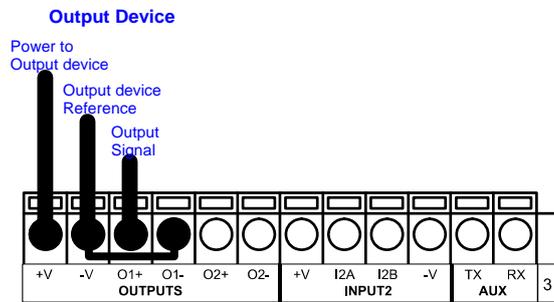
Figure 41 - Open Collector Output Using SC4000 Power

OUTPUT CONNECTIONS USING EXTERNAL POWER
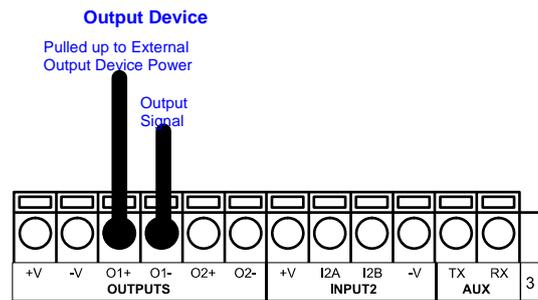
Figure 42 - Output Open Emitter Using External Power
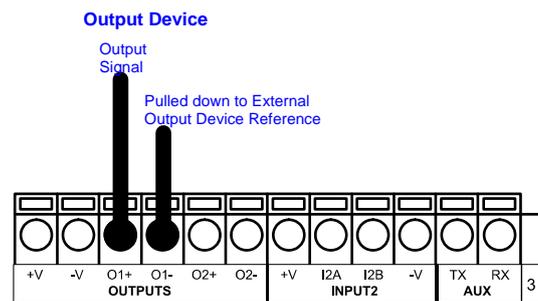
Figure 43 - Output Open Collector Using External Power

5.9 OTHER I/O

Two further input signals and one output signal, which are not normally used in standard applications, are available on the SC4000 spring clamp terminals.

These further input/output options are:

- one optocoupled polarity sensitive input (Input 3)

- one optocoupled polarity sensitive input (Input 4) only available to the reading device connected to the 25-pin connector

- one optocoupled polarity sensitive output (Output 3)

The connections are indicated in the following diagram:

Pinout	Function
O3A	Output 3+ (polarity sensitive)
O3B	Output 3- (polarity sensitive) (3B = 3-)
+V	Power Source – Other I/O
I3A	Input 3A (polarity insensitive)
I4A	Input 4A (polarity insensitive) (to 25-pin connector only)
-V	Power Reference – Other I/O
I34B	Input 3B and 4B (common) (polarity insensitive)
I34B	Input 3B and 4B (common) (polarity insensitive)

Input 4A is not managed by SC4000 and is only available to an optionally connected reading device on the 25-pin connector.

> *The label for Output 3 shows 3A and 3B but this output is polarity sensitive for SC4000 (3A = 3+ and 3B = 3-)*
>
> **NOTE**

6 TYPICAL LAYOUTS

6.1 GENERAL SYSTEM LAYOUT

The following figure shows the typical layout.
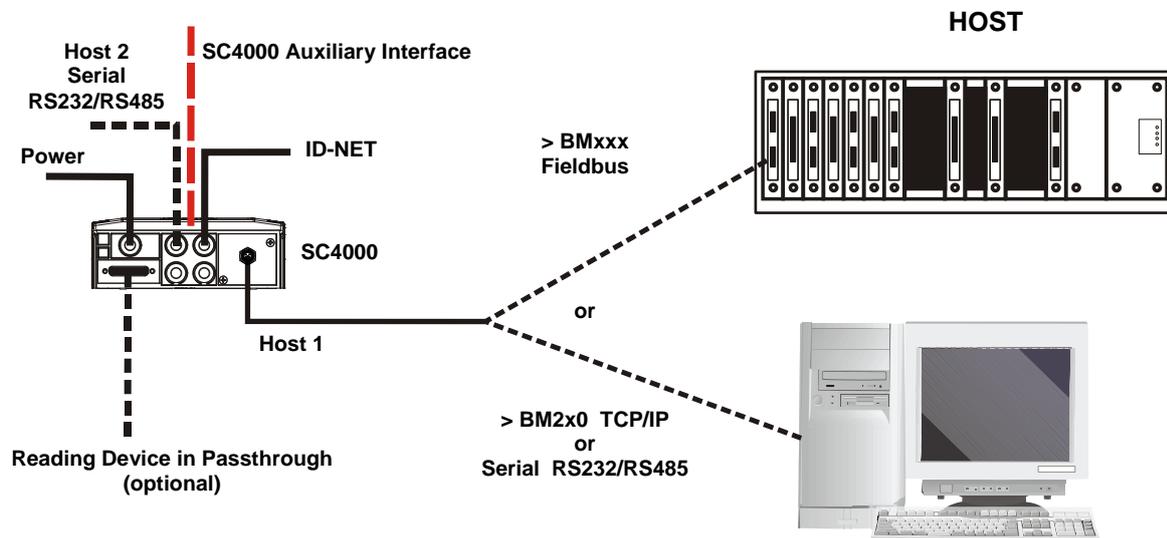
Figure 44 – System Layout

The general system layout allows the SC4000 ID-NET Controller to connect a network of readers (scanners and/or imagers), collect their information and send it to a Host over a serial or TCP/IP or Fieldbus interface.

Generally the external system Host is connected to the SC4000 Host 1 interface. The ID-NET interface connects to the readers network.

The dotted lines in the figure refer to optional hardware configurations.

Host 2 can be connected to a secondary serial interface Host, monitor, etc.

A portable PC can be quickly connected to the SC4000 Auxiliary port through the internal 9-pin connector for SC4000 configuration.

An additional optional reading device, such as a Hand-Held reader, can be connected to the 25-pin connector in passthrough towards the Host. The reading device auxiliary interface signals are also available on the internal spring clamp connectors.

After making system cabling and switch settings, switch ON the SC4000 power switch (see Figure 15). The Power LED turns on (blue) when the power connection has the correct polarity. The Power LED turns on (red) in case of wrong polarity.

After SC4000 configuration and system functioning has been verified, close the SC4000 using the four cover screws.

6.2 SC4000 ID-NET™ MULTIDATA MASTER TO SERIAL HOST

① Reader ID-NET™ Interface
② SC4000 ID-NET™ Interface
③ SC4000 Host 1 or Host 2 Serial Interface
④ Aux Interface for SC4000 Configuration and Genius-compatible Slave Reader Configuration through ID-NET
⑤ Reader Auxiliary Interface for Reader Configuration
⑥ Reader in Pass Through on Host 2 or Source Auxiliary Interface
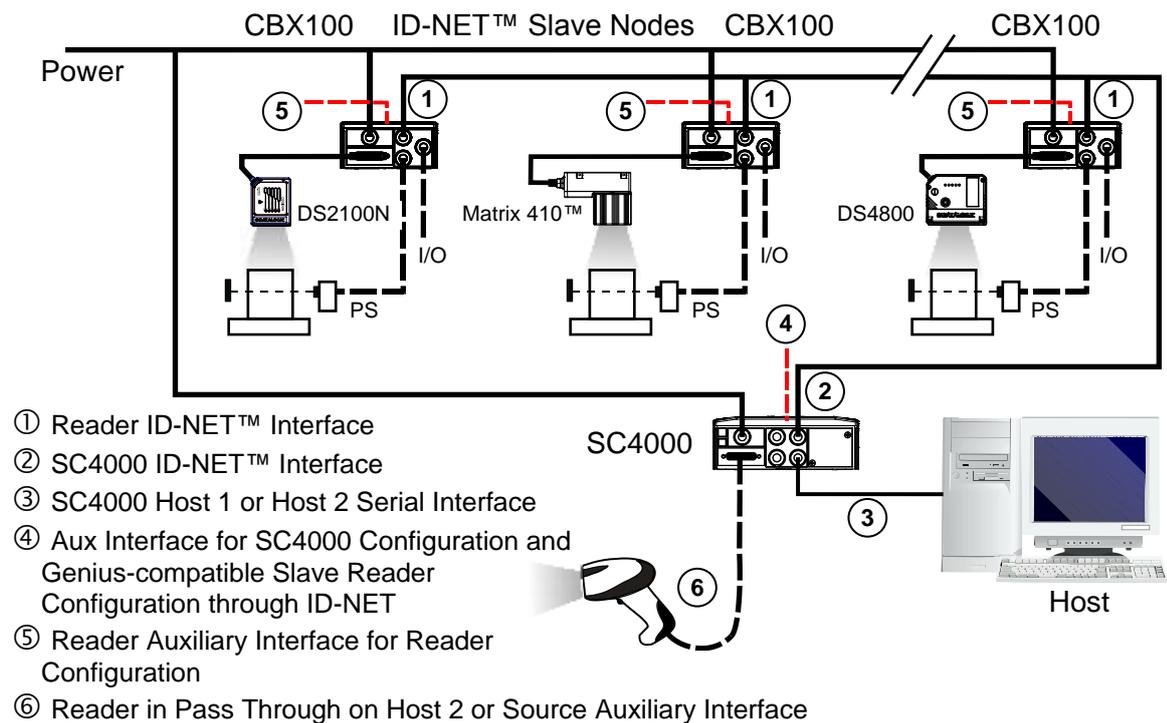
Figure 45 – SC4000 ID-NET™ Multidata Master to Serial Host

Layout **SC4000** **Parameters** **sw package 003 and later**	**ID-NET™ Multidata Master to Serial Host (ex: Host 1 to external Host, HHR to Host 2)**	**Note**
Net Type Rotary Switch	0	**Address rotary switches are ignored**
Topology Role	Master (MULTIDATA)	
System Layout / Host 1 Serial Port Type	Serial	
Communication Settings / Host 1 Serial Port / Line Parameters / Communication Protocol	Standard	
Communication Settings / Host 1 Serial Port / Line Parameters / (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	***Aligned to the Host configuration***	
Communication Settings / Host 2 Serial Port / Line Parameters / Communication Protocol	Standard	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Line Parameters/ (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	***Aligned to the Data Source device configuration***	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through	*<checked>*	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Data Destination: Host 1 Serial Port	*<checked>*	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Termination String	*Aligned to the Data Source device configuration*	*Data Source device to Host 2*

6.3 SC4000 ID-NET™ MULTIDATA MASTER TO SERIAL HOST AND WEBSENTINEL SUPERVISOR
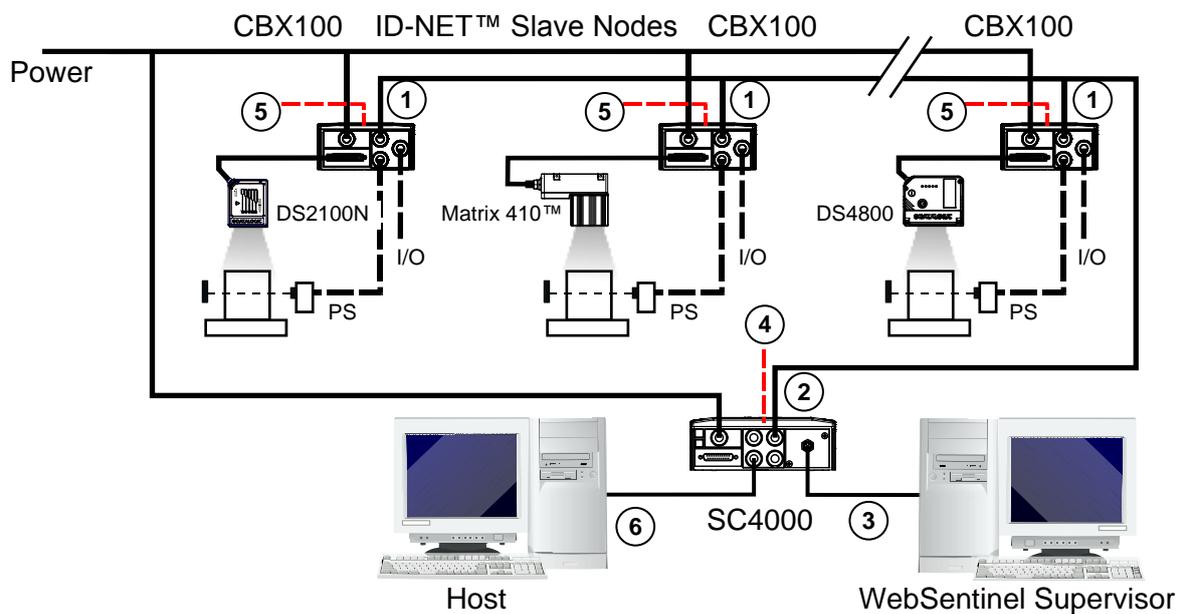
① Reader ID-NET™ Interface
② SC4000 ID-NET™ Interface
③ SC4000 Host 1>BM2x0
   Ethernet TCP/IP Module

④ Aux Interface for SC4000 Configuration and Genius-compatible Slave Reader Configuration through ID-NET
⑤ Reader Auxiliary Interface for Reader Configuration
⑥ SC4000 Host 2 Serial Interface

Figure 46 – SC4000 ID-NET™ Multidata Master to Serial Host and WebSentinel Supervisor

Layout **SC4000 Parameters sw package 003 and later**	**ID-NET™ Multidata Master to Serial Host and WebSentinel Supervisor**	**Note**
Net Type Rotary Switch	7	**Address rotary switches are ignored**
Topology Role	Master (MULTIDATA)	
System Layout / Host 1 Serial Port Type	Ethernet TCP/IP	**BM2x0 Ethernet TCP/IP interface board plugged in**
Communication Settings / Gateway / Line Parameters/ (*all parameters*)	*Aligned to the LAN configuration of the WebSentinel Supervisor*	
Communication Settings / Gateway / TCP/IP Services / User Socket #1 / Status	*<checked>*	
Communication Settings / Gateway / TCP/IP Services / User Socket #1 / Data Tx	*<NOT checked>*	
Communication Settings / Gateway / TCP/IP Services / User Socket #1 / Use as WebSentinel Client	*<checked>*	
Communication Settings / Host 2 Serial Port / Line Parameters / Communication Protocol	Standard	
Communication Settings / Host 2 Serial Port / Line Parameters/ (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	*Aligned to the Host configuration*	
Communication Settings / Auxiliary Serial Port / Data Tx	*<checked>*	
Communication Settings / Auxiliary Serial Port / Line Parameters/ (all parameters)	*Aligned to the Genius PC configuration*	

6.4 SC4000 ID-NET™ MULTIDATA MASTER/FIELDBUS SLAVE TO HOST FIELDBUS MASTER

① Reader ID-NET™ Interface
② SC4000 ID-NET™ Interface
③ SC4000 Host 1>BMxxx Fieldbus Module
④ Aux Interface for SC4000 Configuration and Genius-compatible Slave Reader Configuration through ID-NET
⑤ Reader Auxiliary Interface for Reader Configuration
⑥ Reader in Pass Through on Host 2 or Source Auxiliary Interface
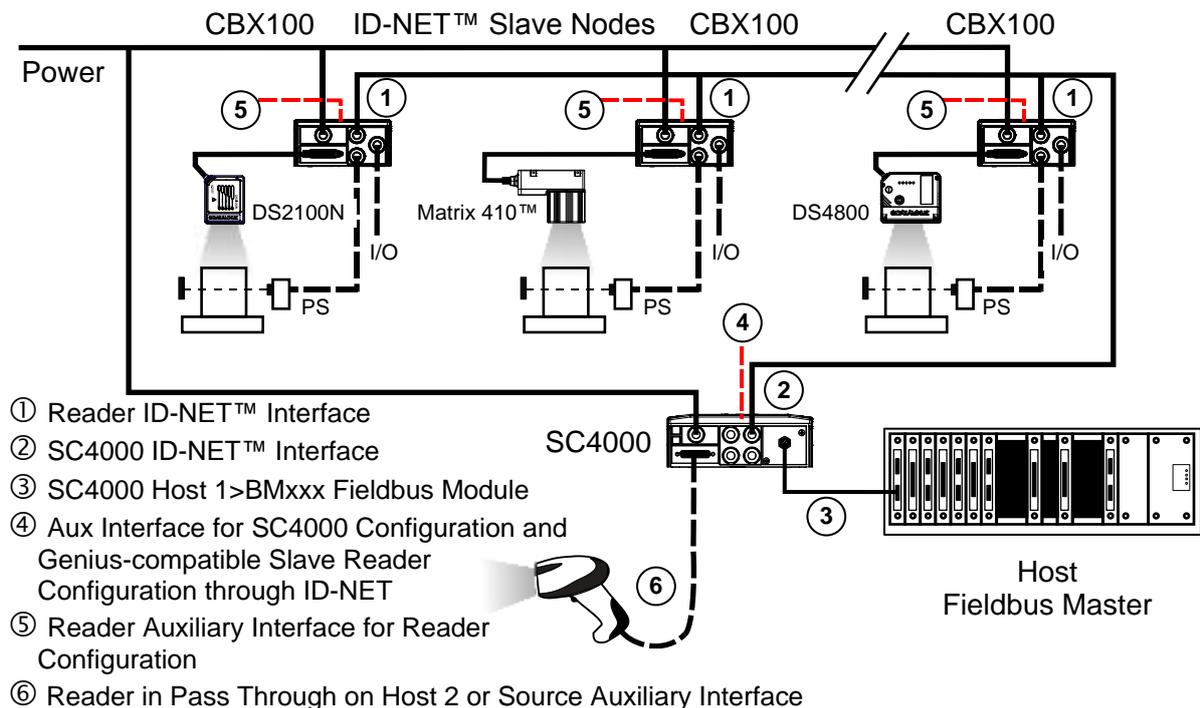
Figure 47 – SC4000 ID-NET™ Multidata Master/Fieldbus Slave to Host Fieldbus Master

Layout **SC4000 Parameters sw package 003 and later**	ID-NET™ Multidata Master/Fieldbus Slave to Host Fieldbus Master (ex: PROFIBUS)	Note
Net Type Rotary Switch	2	**Fieldbus Interface Board = BM3x0**
Address Rotary Switches	X100 = 0, 1 X10 = 0..9 X1 = 0..9	**Address Range= 00..126** (*Aligned to the Fieldbus Master configuration*)
Topology Role	Master (MULTIDATA)	
System Layout / Host 1 Serial Port Type	Profibus	
Communication Settings / Gateway / Status	*<checked>*	
Communication Settings / Gateway / Data Tx	*<checked>*	
Communication Settings / Gateway / Bus Communication / Node Address	***Aligned to the Fieldbus Master configuration***	
Communication Settings / Gateway / Bus Communication / (Master Input Area Size, Master Output Area Size, Data Flow Control, Data Consistency)	***Coming from the GSD modules configuration***	GSD File = **DLA_0BAC.gsd**
Communication Settings / Auxiliary Serial Port / Line Parameters/ (all parameters)	***Aligned to the Data Source device configuration***	*Data Source device to the Auxiliary port*
Communication Settings / Auxiliary Serial Port / Data Pass Through	*<checked>*	*Data Source device to the Auxiliary port*
Communication Settings / Auxiliary Serial Port / Data Pass Through Options / Data Destination: Gateway	*<checked>*	*Data Source device to the Auxiliary port*
Communication Settings / Auxiliary Serial Port / Data Pass Through Options / Termination String	*Aligned to the Data Source device configuration*	*Data Source device to the Auxiliary port*

6.5 SC4000 ID-NET™ SYNCHRONIZED MASTER/FIELDBUS SLAVE TO HOST FIELDBUS MASTER

① Reader ID-NET™ Interface
② SC4000 ID-NET™ Interface
③ SC4000 Host 1 >BMxxx Fieldbus Module

④ Aux Interface for SC4000 Configuration and Slave Reader Configuration through ID-NET
⑤ Reader in Pass Through on Host 2 or Source Auxiliary Interface
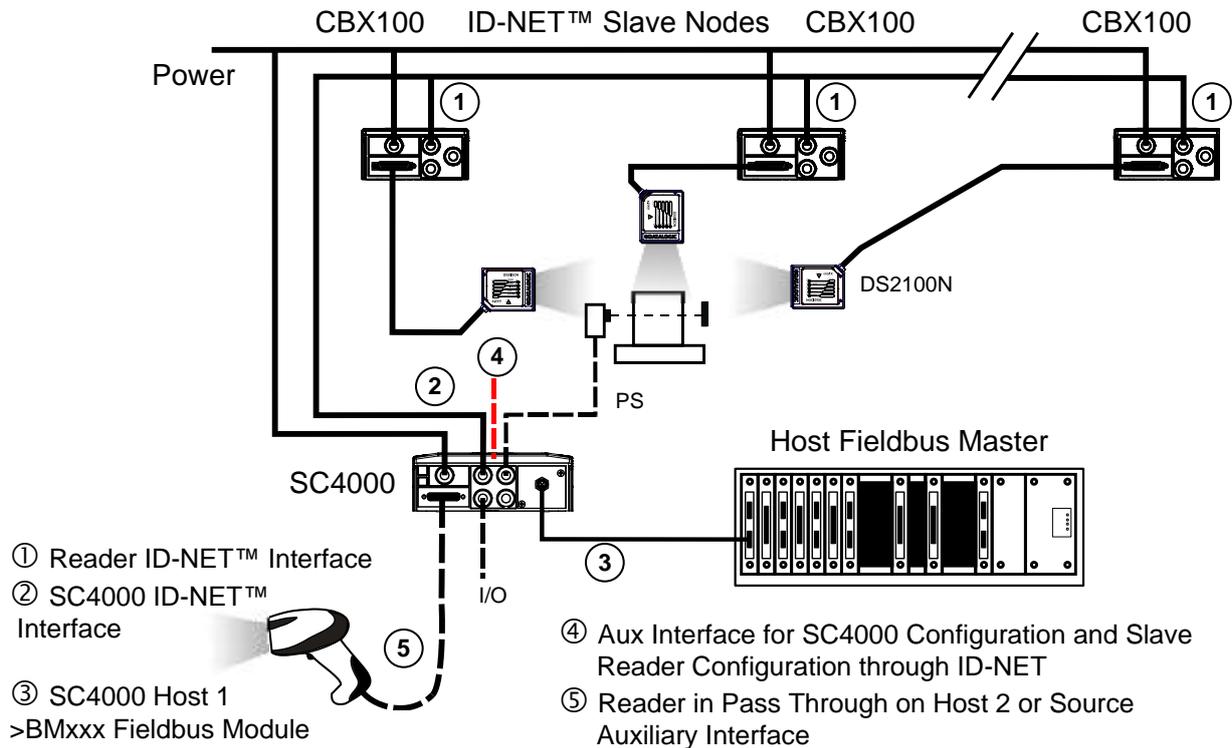
Figure 48 – SC4000 ID-NET™ Synchronized Master/Fieldbus Slave to Host Fieldbus Master

Layout **SC4000 Parameters sw package 003 and later**	ID-NET™ Synchronized Master/Fieldbus Slave to Host Fieldbus Master (ex: DEVICENET)	Note
Net Type Rotary Switch	3	**Fieldbus Interface Board = BM4x0**
Address Rotary Switches	X100 = 0 X10 = 0..6 X1 = 0..9	**Address Range= 00..63**
Topology Role	Master (SYNCHRONIZED)	
System Layout / Host 1 Serial Port Type	Devicenet	
Communication Settings / Gateway / Status	*<checked>*	
Communication Settings / Gateway / Data Tx	*<checked>*	
Communication Settings / Gateway / Bus Communication / Node Address	***Aligned to the Fieldbus Master configuration***	
Communication Settings / Gateway / Bus Communication / (Master Input Area Size, Master Output Area Size, Data Flow Control, Data Consistency)	***According to the Fieldbus application***	
Communication Settings / Host 2 Serial Port / Line Parameters / Communication Protocol	Standard	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Line Parameters/ (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	***Aligned to the Data Source device configuration***	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through	*<checked>*	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Data Destination: Gateway	*<checked>*	*Data Source device to Host 2*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Termination String	*Aligned to the Data Source device configuration*	*Data Source device to Host 2*

7 INDICATOR LEDS
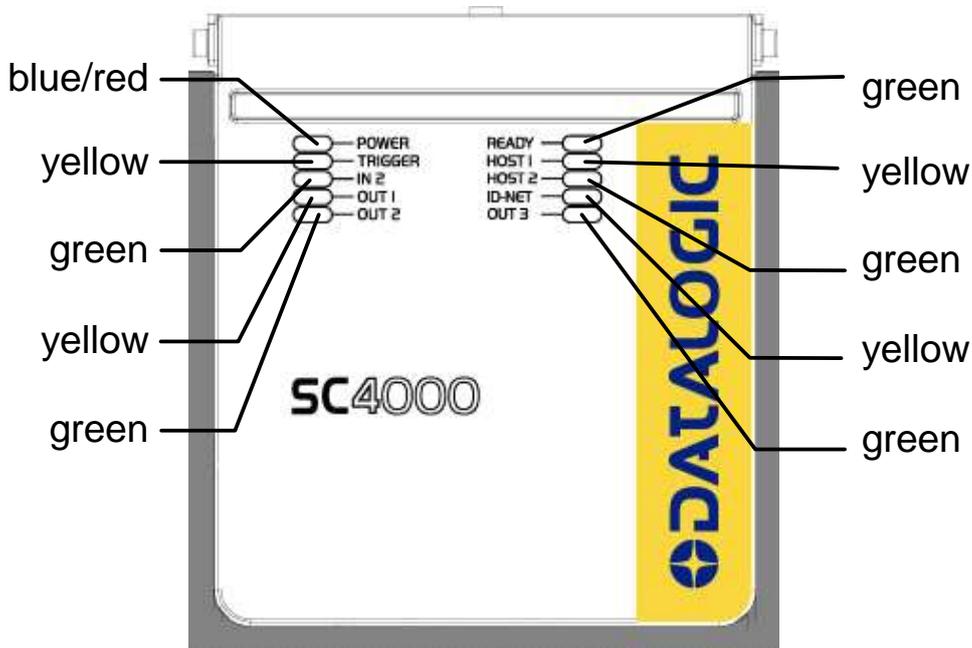
Figure 49 – Indicator LEDs

There are ten Indicator LEDs which signal power, communication, and I/O activity and are visible from the SC4000 outside cover.

The Power LED is blue when power is correctly applied to the SC4000 and the power switch is turned on.

This LED is red if power polarity is incorrect. In this case any optional reading device connected to the 25-pin connector as well as the Backup Module are protected.

> ⚠️ **CAUTION**
> *If external I/O devices are powered through SC4000 (connected to +V/-V), they are not protected from polarity inversion.*

The Ready LED is on after the power-up or reset sequence is complete.

The Host 1, Host 2, and ID-NET LEDs are active when communicating on the respective interface (fast blinking).

The remaining I/O LEDs are active when the respective I/O is active depending on the software configuration setting.

8   DISPLAY AND KEYPAD

English (default)   **German**   **Japanese**

French   **Italian**

The SC4000 Display & Keypad module includes 3 keys (keypad) and a 20x4 display.

8.1   KEYPAD

SC4000 kepyad includes three push button keys, marked as follows:

- Up: (∧)   This key scrolls functions or programmable data UP

- Enter: (O)   This key selects the value of the data shown on the display

- Down: (V)   This key scrolls functions or programmable data DOWN

It is possible to enter the SC4000 menu options by pressing the keypad buttons as described below:

- **Access Menu**: press Up and Down arrow keys <u>simultaneously</u>

- **Scroll**: press and release Up or Down arrow keys

- **Select Item**: press and release Enter key

- **Exit**:   - without selecting any item, select menu [Exit] item
               - during or after the execution of a function. In this case, the following options are possible:

    - press Enter key (only for functions which can be interrupted)

    - timeout (only for appropriate functions)

    - restart of the application (only for appropriate functions)

    - at the end of completed execution (for functions which cannot be interrupted)

8.2   DISPLAY

The SC4000 controller is equipped with a 4 line by 20 character LCD display which shows various diagnostic, menu and operating mode messages.

The display language for messages can be selected in Genius™. The currently supported languages are:

8.3 DISPLAY MESSAGES

Execution	Message Type	Display
	Critical Procedures	
Genius™	File Transfer	File receiving messages: Receiving, Received, Checking file, Saving file, File saved, Restarting, File not saved, Wrong software version.
		File transmission messages: Transmitting, Transmitted, Transfer failed
Genius™ SC4000	Backup & Restore	Backup Result: Done, Error, CBX write protection enabled,
		Restore Result: Done, Error, Backup missing
Genius™	NET-Autoset	Start searching new nodes, Stop searching new nodes, Found new node assigned address, Replacing device,
Genius™	Restore Default Parameters	Keep pressed to set default, Setting default, Default set
SC4000	**SC4000 Menu**	
	Menu Selection	Exit, Network State, Reading Mask, Backup, Restore
Network	**Diagnostic Alarms**	
	Generic alarm	Alert failure yyy
	Network alarm (Master ID-NET)	Node xx duplication, Node xx missing, Node xx configuration
	ID-NET: Slave local alarm	Node xx Fail yyy,
	CBX alarm	Fieldbus failure, Fieldbus mismatch, (Rotary switch) wrong selection, Communication failure, DHCP problem
Operation	**Reading Results**	
	Reading result Reading mask	Reading, No Read, Good Read, Multiple Read, Partial Read, Good Code, Wrong Code
Powerup	**Welcome Messages**	
	Welcome and Startup	Model, Software, Network Configuration, Host Interface Module Type

The messages shown on the SC4000 display are divided into different categories each with its own priority depending on the level of importance.

Below is the list of messages, and a few examples providing help to interpret the information reported.

* Diagnostic Alarm Messages can be enabled/disabled in Genius™.

8.3.1 Backup And Restore Procedure

The backup and restore functions are valid for any application layout type. They can be performed by:

- the SC4000 Menu through its Display and Keypad

- the Genius™ Device Menu>CBX/SC4000 Backup & Restore command.

If it ever becomes necessary to replace the SC4000 it can be quickly configured by substituting the Backup and Restore module inside the new SC4000 with the old one and then performing the Restore procedure.

The Backup and Restore Module <u>always provides complete backup and restore</u> functions (Configuration and Environmental parameters) and cannot be interrupted once started.

- For network nodes, the backup module of the ID-NET™ Master saves the configuration of all the reading devices in the network, Master and all individual Slaves. **The Slaves must be configured with the same network baudrate as the Master before performing the Restore procedure.**

- For single reading device stations or for Slaves, the backup module saves the configuration of the specific connected reading device.

Backup and Restore From SC4000 Display and Keypad

To perform *Backup*:

1. Make sure the Write Protection switch is unlocked (see par. 4.3.4).

2. Press and hold **both** Up and Down arrow keys **simultaneously** to enter the SC4000 main menu.

3. Scroll to the [Backup] item and select it.

4. Select [Yes]. The display shows the message indicating Done or Error at the end of the procedure.

5. Press the Enter key to return to the main menu.

6. Set the Write Protection switch to locked.

To perform *Restore*:

1. Press and hold **both** Up and Down arrow keys **simultaneously** to enter the SC4000 main menu.

2. Scroll to the [Restore] item and select it.

3. Select [Yes]. The display shows the message indicating Done or Error at the end of the procedure.

4. Press the Enter key to return to the main menu.

8.3.2   Example Messages

*	=	vice OK
-	=	Device not detected at startup
?	=	Device detected at startup but not responding to polling
!	=	Device with diagnostic error

Backup and Restore

```
R  e  s  t  o  r  e
S  l  a  v  e    0  5  .  .  .
```

```
R  e  s  t  o  r  e
S  l  a  v  e    0  5     D  o  n  e
```

or

```
R  e  s  t  o  r  e
S  l  a  v  e    0  5     E  r  r  o  r
```

Network State

```
   1        N  e  t  w  o  r  k       1  5
   *  *  *  *  *  -  -  -  -  -  -  -  -  -  -  -
   1  6        N  e  t  w  o  r  k       3  1
   -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
```

Where:

Diagnostic Alarm

```
A  l  e  r  t        :  I  D  -  N  E  T
N  o  d  e  #  0  5     F  a  i  l  #  1  5  1
```

See the References>Diagnostic Error Conditions page in the SC4000 Help On-Line for numeric descriptions..

Reading Result (Master Synchronized only)

F	=	rward direction
R	=	Reverse direction
U	=	Unknown direction
MUL	=	4000 Multidata Topology Role
SYN	=	SC4000 Synchronized Topology Role
ALN	=	SC4000 Other Topology Role
M00	=	SC4000 ID-NET network Master (always 00)
Sxx	=	SC4000 ID-NET network Slave address

```
G  o  o  d     0  1  2  3  4  5  6  7  8  9  0  1  2  3  4
5  6  7  8  9

0  2  C  o  d  e  s
```

When not in Single Label, the reading result (Good, Part, Mult, etc.) is followed by the code data (without separation) and the number of codes read in the reading phase.

```
G  o  o  d     0  1  2  3  4  5  6  7  8  9  0  1  2  3  4
5  6  7

1  8     D  G  T     F
```

When in Single Label, the reading result is followed by the code data (single code), the number of digits in the code and the direction in which the code was read, where:

Reading Mask (Master Synchronized only)

```
P  a  r  t  i  a  l     R  e  a  d
G  0  9  9  %  N  0  0  0  %  M  0  0  0  %  P  0  0  1  %
0  0  1  1  0  0  0  0  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

Four percentage counters display the reading results of the last 100 codes. The bit mask shows which slaves read codes: 0 = not read, 1 = read.

Welcome Message

```
S C 4 0 0 0
S T D    1 . 0 . 0
M U L    M 0 0    L 1
F . B U S : E t h e r n e t T C P / I P
```

Display lines one and two show the SC4000 model and software version. Line three shows the Topology Role:

Line four shows the Host Interface Type.

9 TECHNICAL FEATURES

ELECTRICAL FEATURES	
Supply Voltage	10 to 30 Vdc*
Power Consumption	0.8 - 0.5 A
Limited Current Consumption SC4000 + I/O + optional reading device consumption (see related device manual)	2.5 A
Inputs	Opto-isolated polarity insensitive 30 Vdc max; 12 mA max
Outputs	Opto-isolated polarity sensitive 30 Vdc max; 40 mA max continuous 130 mA max pulsed
COMMUNICATION INTERFACES	
Host 1 Interface	RS232/RS485 up to 115.2 Kbit/s
Auxiliary	RS232 up to 115.2 Kbit/s
Host 2 Interface	RS232/RS485 up to 115.2 Kbit/s
ID-NET™	RS485 Half Duplex up to 1 Mbaud
Communication Protocols	Datalogic Application Driver (DAD Driver)
USER INTERFACE	
LED Indicators: Power On/Polarity Error (blue/red), Trigger (yellow), IN2 (green), OUT1 (yellow), OUT2 (green), Ready (green), Host 1 (yellow), Host 2 (green),ID-NET (yellow), OUT3 (green)	
Display & Keypad	20 x 4 characters & 3 keys
Configuration Modes	Genius™ utility program Genius™ based Host Mode Programming
PHYSICAL FEATURES	
Mechanical Dimensions	193 x 180 x 71 mm (7.6 x 7.1 x 2.8 in.)
Weight	960 g. (33.86 oz.)

The features given are typical at a 25 °C ambient temperature (if not otherwise indicated).

*   for further details about minimum/maximum supply voltage refer to the manual of the connected reading device, since the minimum supply voltage required may be >10.

ENVIRONMENTAL FEATURES	
Operating Temperature	0° to 50 °C (+32° to 122 °F)
Storage Temperature	-20° to 70 °C (-4° to 158 °F)
Humidity max.	90% non condensing
Vibration Resistance EN 60068-2-6	14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz; 2 g @ 70 to 200 Hz; 2 hours on each axis
Bump Resistance EN 60068-2-29	30 g; 6 ms; 5000 shocks on each axis
Protection Class EN 60529	IP65 **

** when compression connectors and reading device or protection cap are correctly connected.
     If Host Interface Modules are used, only correctly installed IP65 models guarantee IP protection.
     Protection is not guaranteed when Standard Host Interface Modules are mounted.
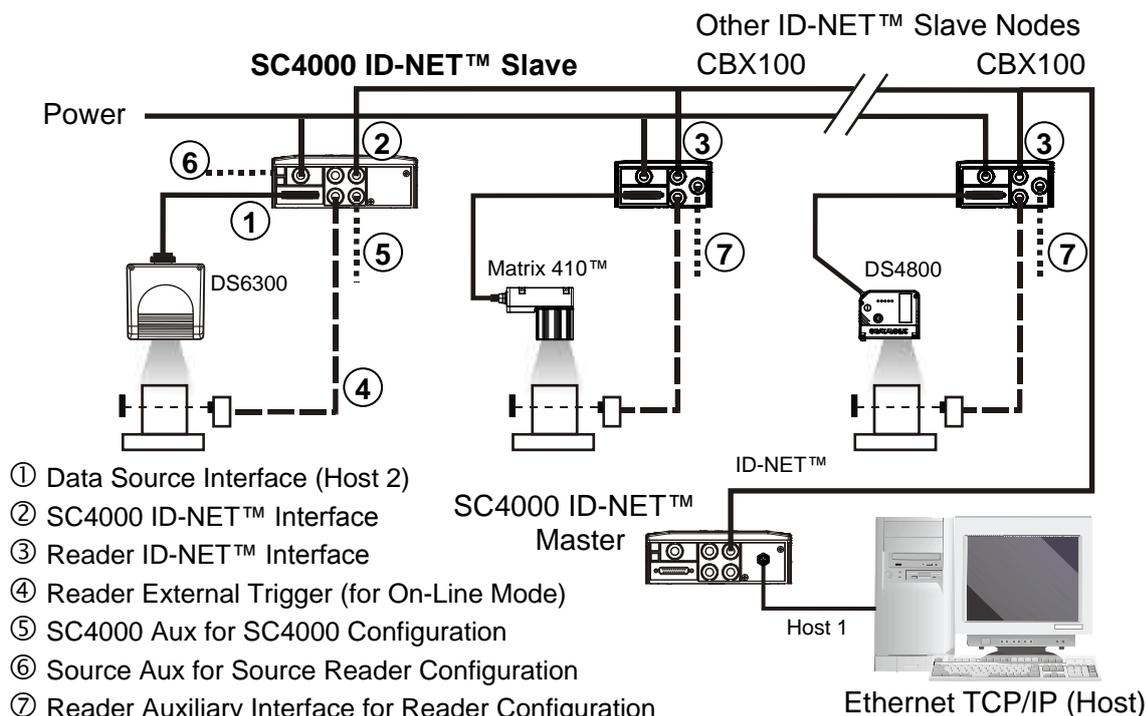
A   ALTERNATIVE LAYOUTS

Other ID-NET™ Slave Nodes

SC4000 ID-NET™ Slave   CBX100   CBX100

① Data Source Interface (Host 2)

② SC4000 ID-NET™ Interface

③ Reader ID-NET™ Interface

④ Reader External Trigger (for On-Line Mode)

⑤ SC4000 Aux for SC4000 Configuration

⑥ Source Aux for Source Reader Configuration

⑦ Reader Auxiliary Interface for Reader Configuration

Figure 50 – SC4000 ID-NET™ Multidata Slave (substitutes a CBX800)

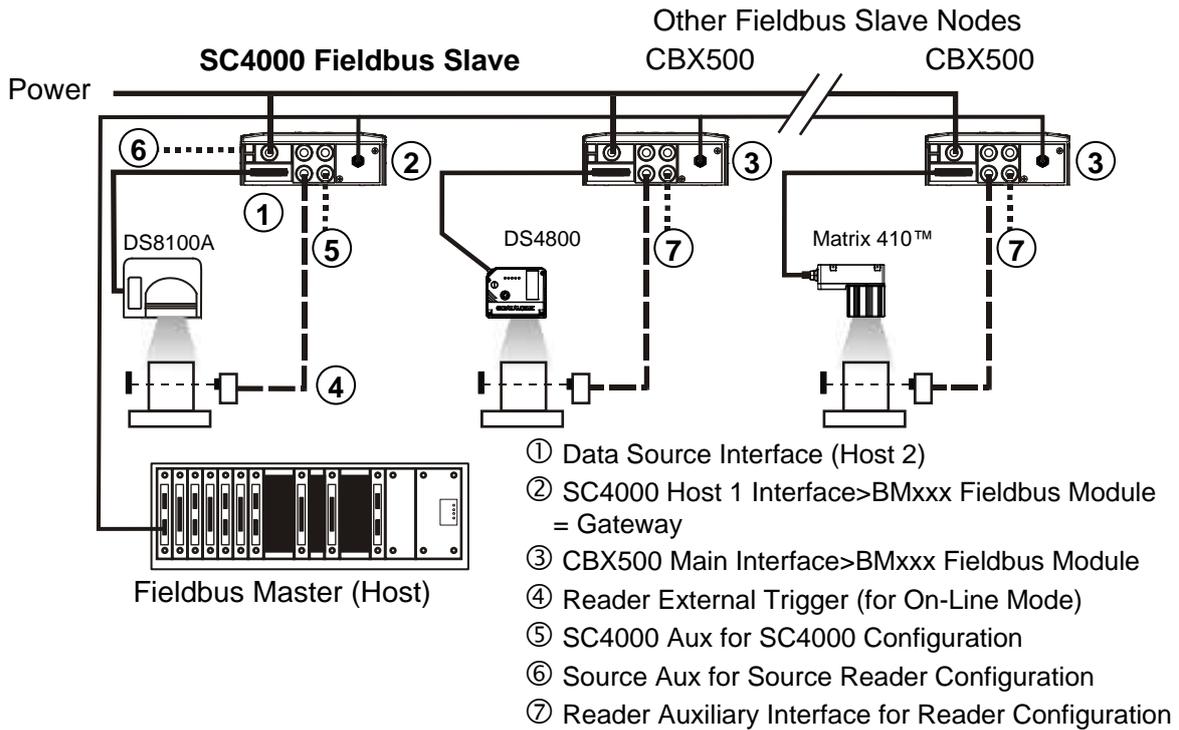| Layout **SC4000 Parameters sw package 003 and later**	ID-NET™ Multidata Slave	Note
Net Type Rotary Switch	9	**ID-NET Multidata Slave**
ID-NET™ Address/Baudrate Rotary Switches	X100 = 0, 6 X10 = 0..3 X1 = 0..9	**Baudrate = 19200..1Mbaud Address Range= 01..31**
Topology Role	Slave (MULTIDATA)	
Slave Address	Slave 1..31	**Must match the rotary switch settings**
System Layout / Host 1 Serial Port Type	Serial	
System Layout / Network Baudrate (bps)	Baudrate = 19200..1Mbaud	**Must match the rotary switch settings**
Communication Settings / Host 2 Serial Port / Data Pass Through	*<checked>*	
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Data Destination: ID-NET	*<checked>*	*Data Source device to ID-NET*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Termination String	***Aligned to the Data Source device configuration***	
Communication Settings / Host 2 Serial Port / Line Parameters / Communication Protocol	Standard	
Communication Settings / Host 2 Serial Port / Line Parameters/ (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	*Aligned to the Data Source device configuration*	

① Data Source Interface (Host 2)
② SC4000 Host 1 Interface>BMxxx Fieldbus Module = Gateway
③ CBX500 Main Interface>BMxxx Fieldbus Module
④ Reader External Trigger (for On-Line Mode)
⑤ SC4000 Aux for SC4000 Configuration
⑥ Source Aux for Source Reader Configuration
⑦ Reader Auxiliary Interface for Reader Configuration

Figure 51 – SC4000 Fieldbus Slave Node (substitutes a CBX800/CBX500)

Layout **SC4000 Parameters sw package 003 and later**	Fieldbus Gateway (Example: Profibus Interface board = BM3x0)	Note
Net Type Rotary Switch	2	
Node Address Rotary Switches	X100 = 0, 1 X10 = 0..9 X1 = 0..9	**Address Range= 00..126**
Topology Role	Other	
System Layout / Host 1 Serial Port Type	Profibus	
Communication Settings / Gateway / Status	*<checked>*	
Communication Settings / Gateway / Data Tx	*<checked>*	*Data Source device to Gateway*
Communication Settings / Gateway / Bus Communication	***Aligned to the Fieldbus Master configuration***	
Communication Settings / Host 2 Serial Port / Data Pass Through	*<checked>*	
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Data Destination: Gateway	*<checked>*	*Data Source device to Gateway*
Communication Settings / Host 2 Serial Port / Data Pass Through Options / Termination String	***Aligned to the Data Source device configuration***	
Communication Settings / Host 2 Serial Port / Line Parameters / Communication Protocol	Standard	
Communication Settings / Host 2 Serial Port / Line Parameters/ (Electrical Interface, Baud Rate, Parity, Data Bits, Stop Bits)	*Aligned to the Data Source device configuration*	

INDEX