HIRSCHMANN
A BELDEN BRAND

Scalable Mobile Control System

Versatile. Powerful. Safe.

The Scalable Mobile Control System is the solution of choice whenever you take on really big challenges and deliver efficient, future-proof control solutions that give your customers exactly what they require. Modular system design provides a platform which supports accurately tailored solutions and tomorrow's safety standards.

Out of sight, but always in control.

In a world that's getting more complex and networked, you need powerful solutions for your mobile applications.

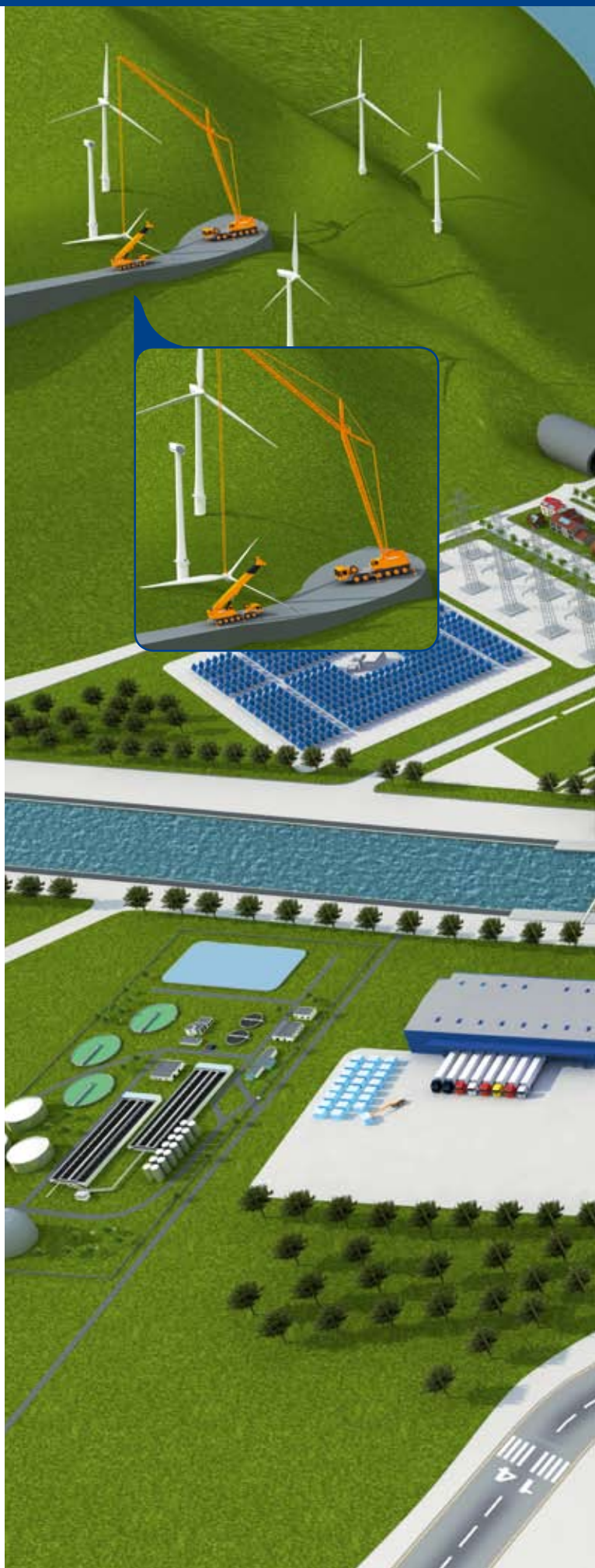
Increasing demands made upon hoisting and material handling machines, combined with today's greater safety awareness, are steadily increasing the requirements of mobile control systems. Greater calculation power, extended functionality and absolute operating reliability are called for even under the most challenging working conditions.

Moreover, international competition and the amazing pace of technological innovation are spurring machine builders to further differentiate their products and reduce manufacturing costs, while maintaining maximum quality and reliability.

This is why Belden developed its innovative Scalable Mobile Control System for your top-quality mobile cranes and construction machinery.

Benefit from the unique experience and expertise of the PAT, Krüger and Hirschmann™ brands – with Belden, the world market leader in signal transmission solutions.

PAT
KRÜGER



Our new Mobile Control Technology does a perfect job. So you can do yours.

Your customers expect maximum flexibility from you everyday. You should expect nothing less from the control system of your mobile equipment.

Belden's Scalable Mobile Control System concept offers an innovative system solution with a clear focus on mobile plant automation capable of easy customization to specific application requirements. As a universal automation system, it represents an optimal solution for applications in centralized and distributed configurations.

Our modular control system delivers tailor-made hardware and software solutions, offering a unique set of advantages, and conceived to meet your needs perfectly. Modular design guarantees that your efficient, cost-optimized solutions grow along with your applications. Maximum adaptability provides fast and ideal solutions to your requests.

High-Performance Solutions that grow along with your challenges.

Modularity and Scalability

These are the defining attributes of the iFLEX console- and iSCOUT Control-systems. This flexibility allows both OEMs and end-users to save money and panel space when building their automation system for mobile plant applications.

Performance

The iFLEX systems provide a variety of performance levels, ranging from low-end I/O controllers through to high-performance controls for sophisticated mobile automation solutions in harsh environments.

Safety

The mobile SIL2-certified controls from the iFLEX S2 product series are programmable controllers combining the performance of highly integrated 32-bit microprocessor technology with an integrated safety system for safety-related applications, in a compact housing designed for harsh environments.

Open Standards

The application software can be separated from safety-related software functions and protected against modifications. The operating system offers multi-tasking and user-defined interrupt handling. The application software is programmable according to IEC61131-3 with CoDeSys or alternative in C.

Diagnostics

In addition, the inputs and outputs of iFLEX S2 offer various diagnostic capabilities and are protected against overload and short circuit. A start-signal input enables a defined shutdown if the ignition is switched off.

Safety is the most important engineering task.

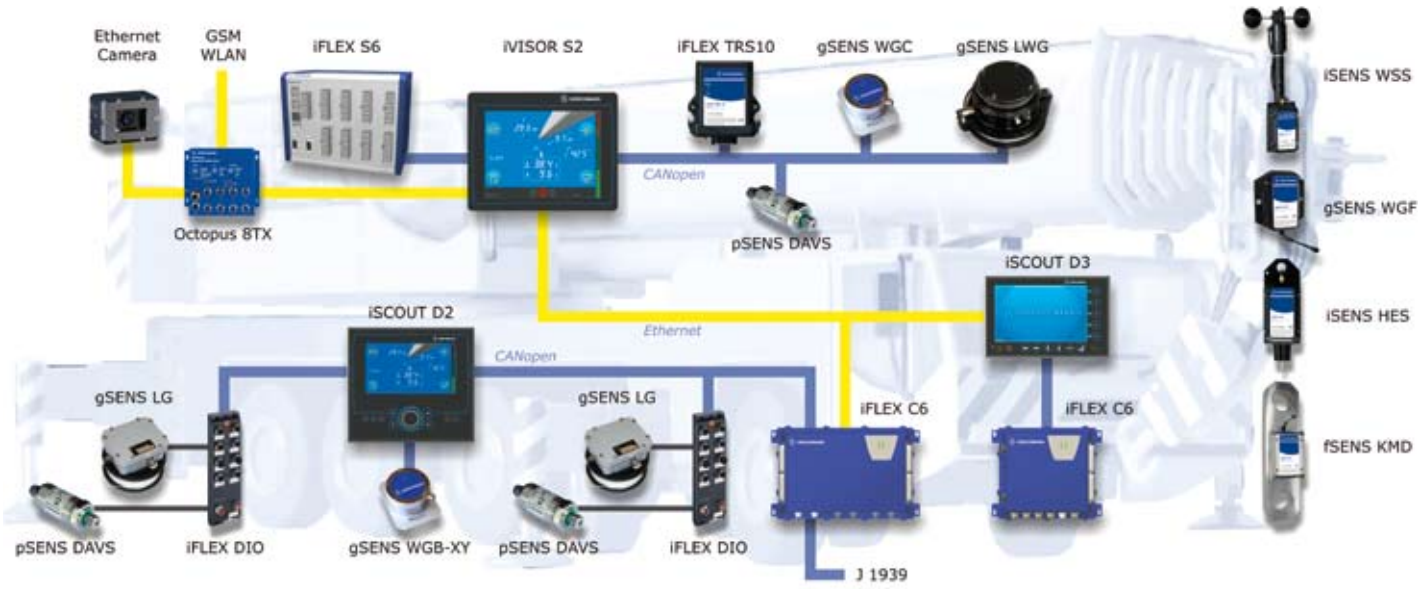
The new 2006/42/EC directive on machinery highlights that the increased frequency of accidents caused by the use of machines can be significantly reduced by integrating a comprehensive safety concept into their design, construction, installation and maintenance.

Our Scalable Mobile Control System responds to this requirement exhaustively by meticulously managing all factors vital to human safety, and to the control and protection of the machine. Powerful auto-diagnostic and monitoring functions are integrated to promptly localize anomalies or faults, thus inhibiting any hazardous maneuvers.

These features make our Scalable Mobile Control System a powerful, safe solution for all mobile applications:

- Compliance with forthcoming standards EN IEC 13849-1 and ISO 61508
- Sturdy design and high resistance to shock and vibration
- Higher electromagnetic compatibility levels as standards require
- An extended operating temperature range
- High protection against humidity, powder, water and saline fog
- Modular I/O configuration
- PWM outputs to directly drive solenoids and hydraulic proportional valves
- Enhanced calculation functions
- Integrated software function blocks such as Safe Load Indication (SLI)
- A complete auto-diagnostic system
- A datalogger to record customizable information on events, alarms, overloads, lifting cycles and counters
- Integrated Safety according to EN ISO 13849-1

The integrated safety function of our Scalable Mobile Control System's integrated safety system consists of a Safety Controller, Hirschmann™ Safety Protocol, Safety Task and Threading Framework – to monitor the main processor and the main loop of the application program. With this integrated safety architecture, the Scalable Mobile Control System fulfils Performance Level c (SIL 1) or Performance Level d (SIL 2) according to EN ISO 13849-1.

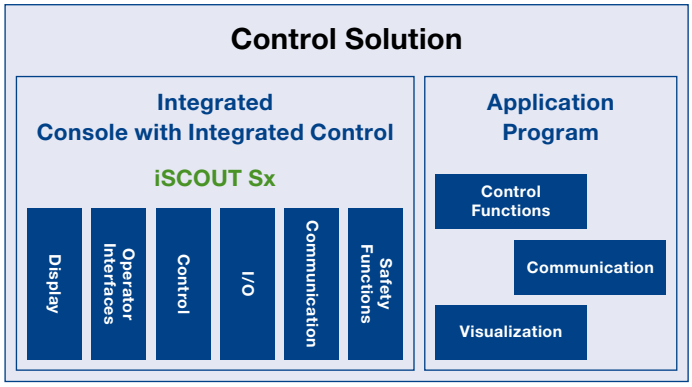


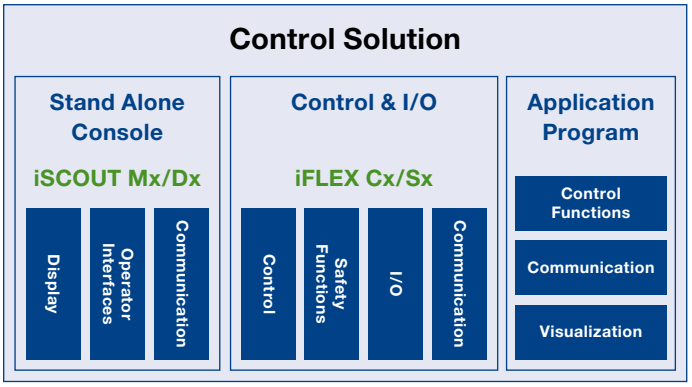
Flexible System Architecture for perfect customization.

The Scalable Mobile Control System was designed to control and monitor machine function, while offering the option of Safe Load Indication (SLI). The system's versatility enables it to be installed on virtually any machine. This scalable approach allows it to be used in any application, ranging from monitoring standard control solutions through to the most complex custom-control solutions.

Belden's Scalable Mobile Control System gives OEMs the flexibility to cost-effectively tailor the input and output components as needed, rather than engineering their own custom solutions. Components can be mixed and matched, depending on the application.

The Scalable Mobile Control concept can be configured either as a stand-alone console concept with seperate control or it can feature a console with integrated PLC control.





iFLEX Controls

The new Mobile Control System consists of CPUs covering the performance range from Low-End up to High-End controls, with a selection of different models to choose from, available in different IP protection classes. The controls combine 32-bit microprocessor technology with an integrated system for safety-related applications in a compact housing designed for harsh environments.

The **IP20** version of iFLEX controls offers flexible I/O configuration combined with a compact design, allowing up to 200 I/Os in the base system and support of an expansion rack. Besides the integrated communication interfaces, additional communication options can be also adapted to tailor the system to the application requirements.

The **IP66/67** version of iFLEX controls combines the same performance and functionality levels of the IP20 version together with a high protection class of IP66 and IP67 (version with IP6k9k is also available as an option). Besides a basic set of integrated I/Os, the IP66/67 version also has the choice of additional modular I/O and communication options.

iSCOUT Consoles

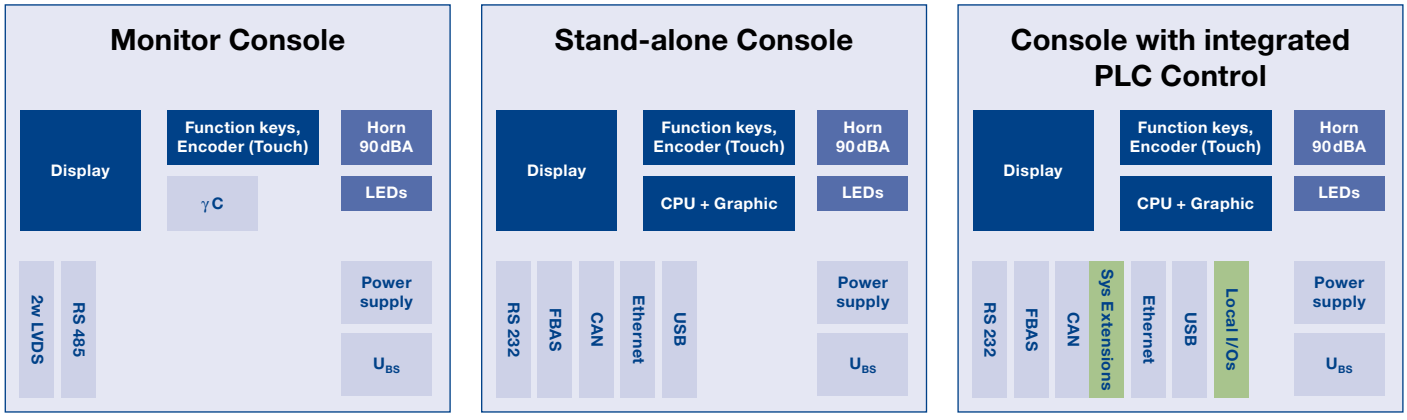
The iSCOUT Console family features a variety of display sizes and resolutions, human interfaces such as a touch screen, function keys and rotary encoder. The selected display supports an extended temperature range from –30°C up to +70°C and installation in extreme external environmental conditions.

Display Size and Resolution

- 4.3" QVGA
- 7" WSVGA
- 10.4" VGA/SVGA

iSCOUT Console Versions

The iSCOUT Consoles are available as Monitor Console for cost-effective solutions where the graphic CPU is integrated in the iFLEX Control system. The Stand-alone Console features an integrated Graphic-CPU using standard communication to the iFLEX control system where the Console with Integrated PLC Control offers a compact solution for small applications.



CPU Modules

A full range of powerful 32-bit CPUs with fully integrated Safety Controller for supervision and diagnostics of the main controllers and integrated technological functions are available for the Scalable Mobile Control System.

One common software platform for the complete controller range offers full software compatibility, so that the same application software may run on all CPUs.

Program or firmware updates are implemented easily with an USB Memory Stick. All iFLEX Controls are designed for use under extreme external environmental conditions, i. e. with an extended temperature range from –40°C up to +70°C.

Systems without CPU are also available as Expansion Rack (IP20) or Module (IP66/67).

CPU Interfaces

- Ethernet 10/100 base-T
- V.24
- USB 2.0
- Status LED's
- CANopen/CANopen Safety
- SYS Extension
- Interface for Monitor Console (optional)

Programming: The Scalable Mobile Control System is programmable according to IEC 61131-3 with CoDeSys or alternativ in C.

iFLEX (IP20 & IP66/67) CPU and I/O Expansion Modules

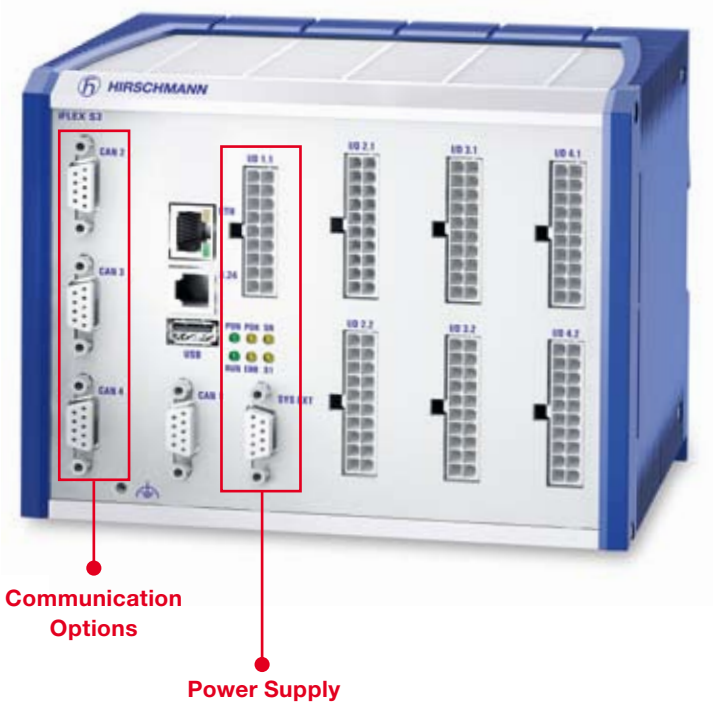
	iFLEX C6 Low-End Controller	iFLEX S2 Low-End Controller	iFLEX S3 Mid-Range Controller	iFLEX S6 High-End Controller	I/O Expansion Rack/Module
CPU	32-bit/150 MHz	32-bit/150 MHz	32-bit/400 MHz	32-bit/700 MHz	–
MIPS	100	100	100	100	–
Flash	8 Mbps	16 Mbps	32 Mbps	64 Mbps	–
RAM	16 Mbps	16 Mbps	32 Mbps	64 Mbps	–
RAM battery backed	512 Kbps	1 Mbps	1 Mbps	2 Mbps	–
Optional Micro SD Card	–	–	–	X	–
Embedded LCD Controller	X	X	–	X	–
EN13849-1 Classification	PL c, Cat. 2	PL c, Cat. 2	PL c, Cat. 2	PL c, Cat. 2	PL c, Cat. 2
SIL Classification	SIL 1	SIL 2	SIL 2	SIL 2	SIL 2
Order Code	C6	S2	S3	S6	IX

The Power Supply Module.
High-performance, safe and durable.

The power supplies of the Scalable Mobile Control System are designed for use on Mobile Plant Applications. The DC/DC power supply is fully protected as a system point of load power supply, featured with an Active Over Voltage Limitation (OVL) according to ISO 7637-2, Puls 1 up to 4 and 5 B (> 80 V at 2 Ω).

The power supplies are equipped already with some I/Os as well as with 2 serially connected safety cut-off relays to meet EN 13000 requirements, for example

- UB 9 $V_{min.}$ up to 48 $V_{max.}$
- Reverse Voltage Protection up to 100 V
- Short Circuit Protection
- Low-Pass-Filter
- Active Over Voltage Protection
- Safety Cut-Off Relays
- Diagnostic LEDs: (Power ON, Power OK, Safety Relay ON, RUN, Error, S1-free programmable LED)



Communication Options

To adapt the Scalable Mobile Control System to the specific requirements, several communication modules are available as an option. iFLEX S6 CPUs feature an Embedded LCD controller supporting up 4 FBAS video cameras directly.

Communication Options

IP20		Order Code
CAN extensions	3 x Sub-D	2C3
	5 x M12 (only for iFLEX S6 with galvanic isolation)	2C5
Ethernet	4 x RJ45	2E4
FBAS video inputs	4 x Mini BNC	2F4
Zigbee extensions	1 x Mini BNC	2Z1
IP66/67		
CAN extensions	3 x M12	6C3
Zigbee extensions	1 x Mini BNC	6Z1

I/O Modules of iFLEX Systems

Our Scalable Mobile Control System features a wide range of specialized input and output options including PWM outputs with current control or DIAG inputs with additional diagnostics. Integrated self-testability of all safety declared I/Os.

The following I/Os could be used as safety declared I/Os according to EN ISO 13849-1 Cat. 2 with Performance Level PL d.:

- Digital Input — DI DIAG
- Analog Input (11 Bit) — AI
- Analog Output (11 Bit) — AO
- Digital PWM Output with Current Control — DO PWM w/CC
- Digital Static Output — DO

The DI DIAG inputs provide the following diagnostics with external 1 k : 4 k 7 resistors:

- Short to Battery
- Short to Ground
- Open Load

All digital outputs use the new generation of high voltage PROFET technology with integrated short circuit, TVS and over heating protection. The PWM outputs offer a high crest factor of 4 A for 2 A and 2.25 A for 4 A outputs. The current control of the PWM outputs can be configured between 50 Hz and 400 Hz.

iFLEX (IP20) PS and I/O Modules

Besides the CPU and the Power Supply, each IP20 rack can be configured with up to 6 I/O module options. The maximum configuration of an expansion rack contains one Power Supply and up to 6 I/O module options.

PS and I/O Modules for IP20 systems

	PS DC 5 V + I/O	PS DC 5/12 V + I/O	I/O 02-03	I/O 04-04	I/O 05-05	I/O 06-06	I/O 05-06	I/O 02-04	I/O 07-08
DI w/HSC	–	–	4	16	–	–	–	12	4
DI DIAG w/o HSC	8	8	8	16	–	–	–	12	4
AI (4–20 mA, 0–10 V)	–	–	8–10* (4–20 mA) 0–4** (0–10 V)	–	–	–	–	0–2** (4–20 mA)	8
AO (0–10 V)	–	–	–	–	–	–	–	–	4
DO (1 Aavg)	3	3	4	–	24	–	12	4	–
DO PWM w/Current control (2 Aavg)	3	3	4–2*	–	–	8***	4***	4–2**	–
DO PWM w/Current control (4 Aavg)	–	–	–	–	–	8	4	–	–
CutOff-Relay	1+1	1+1	–	–	–	–	–	–	–
DO-Relay	–	–	–	–	–	–	–	–	8
Order Code	PA01	PB01	23	44	55	66	56	24	78

* If DO PWM is used without Current Control, additional AI are available.
** Selection of voltage input reduces number of current input.
*** Without Current Control.

Accessories such as cables or connectors are described in the price list.

iFLEX (IP66/67) PS and I/O Modules

Besides a basic set of integrated I/Os (see IP66/67 I/O module matrix for details), the IP66/67 version also has additional modular I/O and communication options. The basic housing supports one additional option where the extended housing supports up to 4 optional modules.

PS and I/O Modules for IP66/67 systems

	PS DC + Basic I/O	I/O 01	I/O 02	I/O 03	I/O 04	I/O 05	I/O 06	I/O 07	I/O 08
DI w/HSC	4	–	4	–	8	–	–	–	4
DI DIAG w/o HSC	12	8	4	4	8	–	–	–	4
AI (4–20 mA, 0–10 V)	0–2* (4–20 mA)	–	0–2* (4–20 mA)	8–10* (4–20 mA) 0–4** (0–10 V)	–	–	–	8	–
AO (0–10 V)	–	–	–	–	–	–	–	4	–
DO (1 Aavg)	7	3	4	–	–	12	–	–	–
DO PWM w/Current control (2 Aavg)	7–5*	–	4–2*	–	–	–	4***	–	–
DO PWM w/Current control (4 Aavg)	–	–	–	–	–	–	4	–	–
CutOff-Relay	1+1	–	–	–	–	–	–	–	–
DO-Relay	–	–	–	–	–	–	–	–	8
Order Code	PA12	01	02	03	04	05	06	07	08

* If DO PWM is used without Current Control, additional AI are available.
** Selection of voltage input reduces number of current input.
*** Without Current Control.

Accessories such as cables or connectors are described in the price list.

Configure your Scalable Mobile Control System to your specific requirements.

This matrix will help you to configure your Scalable Mobile Control System to be fully customized to your needs and your application.

iFLEX Controller / I/O Expansion

		CPU	–	IP	Power Supply	Commu-nication Options	–	I/O	I/O	I/O	I/O	I/O	I/O	–
CPUs														
iFLEX C6 Low-End Controller	C6		–				–							–
iFLEX S2 Low-End Controller	S2		–				–							–
iFLEX S3 Mid-Range Controller	S3		–				–							–
iFLEX S6 High-End Controller	S6		–				–							–
I/O Expansion	IX		–				–							–
Protection Classes														
IP20	20		–				–							–
IP66/67	66		–				–							–
IP69K	69		–				–							–
Power Supplies														
IP20: PS DC 5V + I/O 01	PA01		–				–							–
IP20: PS DC 5/12V + I/O 01	PB01		–				–							–
IP6x: PS DC + Basic I/O	PA12		–				–							–
Communication (optional)														
IP20: 3 x CAN Expansion	2C3		–				–							–
IP20: 5 x CAN Expansion[1]	2C5		–				–							–
IP20: 1 x Zigbee Expansion	2Z1		–				–							–
IP20: 4 x Ethernet	2E4		–				–							–
IP20: 4 x FBAS Video inputs[1]	2F4		–				–							–
IP6x: 3 x CAN Expansion	6C3		–				–							–
IP6x: 1 x Zigbee Expansion	6Z1		–				–							–
I/Os (optional)														
IP20: I/O 02-03	23		–				–							–
IP20: I/O 04-04	44		–				–							–
IP20: I/O 05-05	55		–				–							–
IP20: I/O 06-06	66		–				–							–
IP20: I/O 05-06	56		–				–							–
IP20: I/O 02-04	24		–				–							–
IP20: I/O 07-08	78		–				–							–
IP6x: Module 1	01		–				–							–
IP6x: Module 2	02		–				–							–
IP6x: Module 3	03		–				–							–
IP6x: Module 4	04		–				–							–
IP6x: Module 5	05		–				–							–
IP6x: Module 6	06		–				–							–
IP6x: Module 7	07		–				–							–
IP6x: Module 8	08		–				–							–
Summary of your configuration (order code for not selected communication and I/O options = 00)														
Order Code	**iFLEX**		–				–							–

[1]Only available with CPU S6

Out of sight, but always in control.

Scalable Mobile Control System

HIRSCHMANN
A **BELDEN** BRAND

www.hirschmann.com

GLOBAL LOCATIONS

For worldwide Industrial Sales and Technical Support, visit: www.hirschmann.com

GERMANY

Hirschmann Automation and Control GmbH
Branch Office Ettlingen
Hertzstraße 32 - 34
76275 Ettlingen
Phone: +49 7243 709-0
Fax: +49 7243 709-3222
info.ecs@hirschmann.de
web: www.hirschmann.com

ITALY

Milano
Hirschmann Automation and Control GmbH
Branch Office Italy
Phone: +39 039 5965250
Fax: +39 039 5965255
info-it@hirschmann.com

PEOPLE`s REPUBLIC OF CHINA

Shanghai
Hirschmann Automation and Control (Shanghai) Co., Ltd
Phone: +86-21-5108 2780
ext. 125
Fax: +86-21-5237 5899
info@hirschmann.sh.cn

Xuzhou
Xuzhou Hirschmann Electronics Co., Ltd.
Phone: +86 516 87885799
Fax: +86 516 87793971
infoecs@hirschmann-js.com

UNITED STATES OF AMERICA

Chambersburg
Hirschmann Automation and Control, Inc.
Phone: +1 717 263 -7655
Fax: + 1 717 263 -7845
ecs@hirschmann-usa.com

Regarding the details in this brochure: The information/details in this publication merely contain general descriptions or performance factors which, when applied in an actual situation, do not always correspond with the described form, and may be amended by way of the further development of products. The desired performance factors shall only be deemed binding if these are expressly agreed on conclusion of the contract. Please note that some characteristics of the recommended accessory parts may differ from the appropriate product. This might limit the possible operating conditions for the entire system.

©Copyright 2008, Belden Inc.
Printed in Germany
Edition 11/2008