

# S800 I/O System

for cost-effective process control,  
down to the last field device



Industrial IT  
Solutions  
from ABB

# From project engineering to plant maintenance S800 I/O makes work easier

**S800 I/O is a comprehensive, distributed, process I/O system that communicates with parent controllers over industry-standard field buses. Thanks to its broad connectivity it fits a wide range of process controllers from ABB and others. And it bears the name of ABB Automation, the world leader in industrial IT.**

By permitting installation in the field, close to sensors and actuators, S800 I/O reduces the installation cost by reducing the cost of cabling. And thanks to benefits such as:

- ◆ **flexibility**, permitting a virtually infinite number of installation arrangements, small or large, indoors or outdoors, wall mounting or floor standing,
- ◆ **modularity**, permitting step-by-step expansion without bottlenecks ever developing,
- ◆ **cost-effectiveness**, making you save on hardware, cabling, installation and maintenance,
- ◆ **reliability** thanks to features such as autodiagnosics and redundancy with bumpless, automatic, change-over,

it helps you improve productivity, increase competitiveness and obtain peace of mind.

*S800 I/O is a highly distributed, rugged and reliable process I/O system. Therefore, it is perfect for out-front installation in the field next to the devices that need be monitored/controlled.*

*S800 I/O offers a full range of process signal interfaces, from industry-standard d.c., a.c. and temperature-measurement signals to pulse and frequency counting. You need no other process I/O system.*

*S800 I/O supports both Advant Fieldbus 100 and Profibus DP. Therefore it is on speaking terms with a wide range of process controllers from ABB and others.*

*Thanks to a modular design and many installation communication and configuration alternatives, S800 I/O components can be mixed and matched to suit your plant, hand in glove.*



S800 I/O components; a fieldbus communication interface and an I/O module

I/O

I/O

I/O

I/O

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I/O

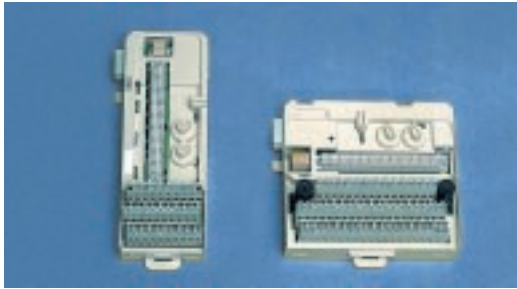
I/O

I/O

I/O

## Installation alternatives to suit each application exactly

S800 I/O is modularly designed, consisting of passive termination bases mounted side by side on standard DIN rails. These bases extend the internal communication bus incrementally



The compact termination base (left) saves space and allows for maximum I/O density, the extended base (right) facilitates direct field-cable termination, thus eliminating the need for external cable marshalling.



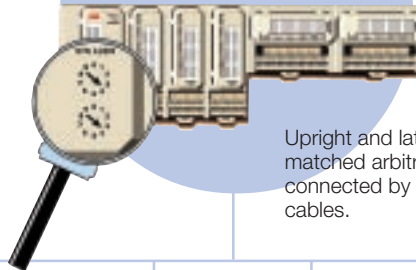
Hardware keys ensure that only the right type of module can be plugged onto each base.

and provide connection terminals for all in- and outgoing cables. Process I/O modules then plug onto these bases, providing the interfacing required to the field.

There are also all-in-one modules available – called S800L I/O – where the base and the actual I/O module are combined into a single indivisible unit. In this case, the process cabling is terminated on detachable screw-terminal blocks. This subfamily is a more cost-effective solution in less demanding applications.

For regular process I/O modules there are two types of termination bases, one Compact, for upright module installation, and one Extended, for lateral installation. The

S800 I/O is almost completely configuration-free; all you have to do is to set the fieldbus station address on the switches provided.



Upright and lateral I/O modules can be mixed and matched arbitrarily, and subordinated I/O clusters be connected by electrical or fiber-optic extension cables.

former results in space savings with maximum I/O channels per rail, the latter in more room for cable termination. Extended termination bases provide fuses and terminals for field power distribution, eliminating the need for external cable marshalling in the majority of cases.

Compact and extended termination bases can coexist in the same I/O station, meaning that they can be mixed and matched to meet the needs for termination of each field device. I.e. maximum installation flexibility.

The space and environmental protection requirements are modest, making S800 I/O ideal for distributed out-front installation for maximum cost savings.

## Little need for external signal conditioning

Digital process interfacing modules typically provide 16 channels while analog modules offer 8. Since an S800 I/O station can accommodate 12 I/O modules, this means up to 192 digitals or 96 analogs per station or any mix between the two extremes. With optional ModuleBus expansion, up to 24 I/O modules can be accommodated, thus doubling the above-mentioned I/O capacity.

The I/O modules of a station can all be mounted on a single rail or be distributed across several, in the latter case using plug-in interconnecting cables.





S800 I/O works with a wide range of process controllers from ABB and others.

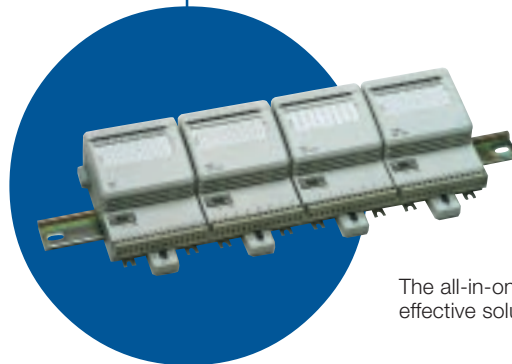
These alternatives make S800 I/O fit a wide range of standard wall-mounting and floor-standing enclosures. The fiber-optic ModuleBus even makes it possible to break up S800 I/O stations into clusters installed hundreds of meters apart, i.e., a new, cost-effective and noise-immune level of distributed control being made available to the control engineer.

There are inputs and outputs for industry-standard d.c. and a.c. signal levels and devices, including resistance-temperature sensors, thermocouples - even pulse and frequency counting. So process devices can be wired up to S800 I/O stations with a minimum of intermediate signal conditioning.

### **Intra-system communications by industry-standard field buses**

S800 I/O supports both Advant Fieldbus 100 and Profibus DP. So it can communicate with a wide range of process controllers from ABB and others. Up to 79 I/O stations can be installed along a single bus, making such an I/O system capable of managing many thousands of I/O. Both electric and fiber-optic communication media are available.

In connection with Advant Fieldbus 100, S800 I/O also offers full dual redundancy, all the way from the communications interfaces down. This means that all



The all-in-one version, S800L I/O, is a more cost-effective solution in less demanding applications.

- *Diagnostic LEDs on all modules.*
- *High data communication security for zero errors.*
- *Each output can be set individually to take on a predefined value or freeze in case of serious trouble.*
- *I/O modules of the regular S800 I/O range can be withdrawn and re-inserted live. Note: does not apply to S800L.*
- *Optional dual redundancy in power supply and fieldbus communications with bumpless change-over and failure reporting.*



communication links are duplicated; there are no common bottle necks.

## Intrinsic safety support

The S800 I/O system includes intrinsic safety I/O modules and an associated termination base, facilitating installation of I/O stations in potentially hazardous (Class I, Div. 2) areas and connection to field devices in hazardous (Class I, Div. 1) areas. Consequently, you can use S800 I/O throughout your plant, standardization that all involved will benefit from.

## Transparent configuration

S800 I/O stations are configured as part of the parent controller like local I/O, which means that no additional knowledge or skills are required. Configurations defined in this way are downloaded automatically on start-up.

## Environment-friendly

The S800 I/O family is designed and manufactured by ABB Automation Products AB, Sweden, which is certified according to the environmental protection standard ISO 14001. So you can go for S800 I/O with a clear conscience.

## Reliability and ruggedness confirmed

S800 I/O has passed tough type tests by leading maritime inspection and classification societies, confirming that the equipment is able to operate reliably and durably even under the most extreme conditions. Reliability and durability you will benefit from.

### Power supply

Supply voltage 24V d.c. (19.2 - 30V)

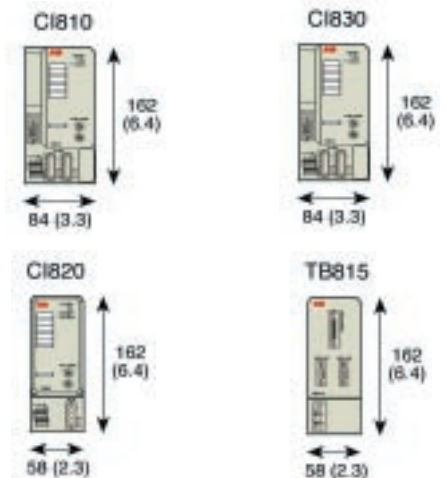
### Communication interfaces / media

- CI810** For Advant Fieldbus 100. Supports dual bus-cable redundancy.
- CI830** For Profibus DP. GSD-file provided.

#### Redundant interface

- CI820** For Advant Fieldbus 100 with dual redundancy. Only in combination with Advant Controller 400 series controllers.
- TB815** **Interconnection Unit.** An electrical and optical ModuleBus interface for coordination of the two parallel CI820 needed.

Dimensions in mm (in.)  
Depth: 122 (4.8)



### Advant Fieldbus 100

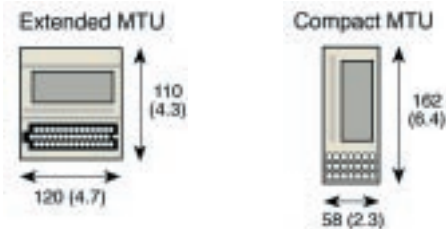
Fieldbus medium	Twisted pair overall screened / coaxial / fiber-optic cable
No. of stations	Up to 79 per bus. Up to 32 per twisted-pair segment
Bus length	Up to 750 m (2 460 ft.) per twisted-pair segment overall up to: 15 km (9.3 miles)

### Profibus DP

Fieldbus medium	Twisted pair overall screened / coaxial / fiber-optic cable
No. of stations	Up to 79 per bus. Up to 32 per twisted-pair segment
Bus length	Up to 1200 m (3937 ft.) per twisted-pair segment



## Module Terminal Units (MTUs)



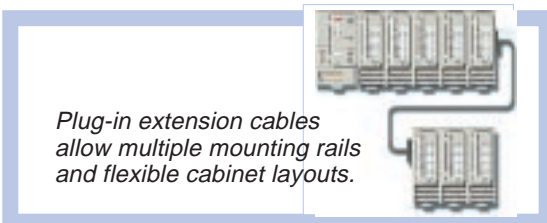
### Compact

<b>TU810 / 811</b>	
Rated insulation	50/250V
Cores	0.2-2.5 mm <sup>2</sup> (AWG 24-12)
<b>TU812</b>	
With 25 pin D-sub connector	
Rated insulation	50V
<b>TU814</b>	
With 3 crimp snap-in connectors	
Rated insulation	50V
<b>TU890, intrinsic safety</b>	
Cores	0,2-2,5 mm <sup>2</sup> (AWG 24-12)

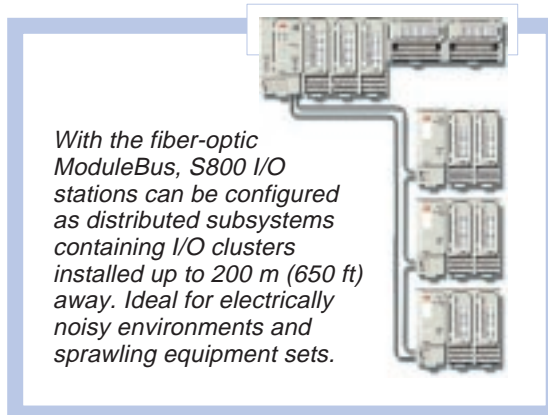
### Extended

<b>TU830 / 831 / 836 / 835 / 837 / 838</b>	
Rated insulation	50/250V
Cores	0.2-2.5 mm <sup>2</sup> (AWG 24-12)/ 0.2-4 mm <sup>2</sup> (AWG 24-10)

## Station layouts



*Plug-in extension cables allow multiple mounting rails and flexible cabinet layouts.*



*With the fiber-optic ModuleBus, S800 I/O stations can be configured as distributed subsystems containing I/O clusters installed up to 200 m (650 ft) away. Ideal for electrically noisy environments and sprawling equipment sets.*

**No. of I/O modules** Up to 12 per station, optionally 24  
**Extension cable** Plug-in, lengths: 0.3, 0.6 and 1.2m (1, 2 and 4ft.)

**Optical ModuleBus**  
 Expansion up to 7 I/O clusters and/or 24 I/O modules  
 Max length 15 or 200 m (49 or 656 ft)

## I/O modules

### ■ Digital input modules

<b>DI801</b>	
No. of channels / Grouping	16 / 1 group
Rating/Type	24V d.c./current sink

<b>DI810</b>	
No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	24V d.c./current sink

<b>DI811</b>	
No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	48V d.c./current sink

<b>DI814</b>	
No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	24V d.c./current source

<b>DI820</b>	
No. of channels / Grouping	8 / Separate returns
Rating/Type	110V d.c., 120V a.c.

<b>DI821</b>	
No. of channels / Grouping	8 / Separate returns
Rating/type	220V d.c., 230V a.c.

<b>DI830, with time tagging</b>	
No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	24V d.c./current sink
Time tagging resolution	<0.5 ms

<b>DI831, with time tagging</b>	
No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	48V d.c./current sink
Time tagging resolution	<0.5 ms

## DI885, with time tagging & wire-fault detection

No. of channels / Grouping	8 / 1 group of 8 ch
Rating/Type	24-48V d.c./current sink
Time tagging resolution	1 ms

## DI890, with intrinsic safety & wire-fault detection

No. of channels/Grouping	8 / Separate returns
Rating/Type	24V d.c./ current sink

### ■ Pulse input module

#### DP 820

No. of channels / Grouping	2 / Separate returns
Frequency measurement	0.25 Hz - 1.5 MHz
Signal voltage	5 / 24V d.c

### ■ Digital output modules

#### DO801

No. of channels / Grouping	16 / 1 group
Rating/Type	24V, max 0.5A d.c., transistor, current source / short-circuit-proof

#### DO810

No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	24V, max 0.5A d.c., transistor, current source / short-circuit-proof

#### DO814

No. of channels / Grouping	16 / 2 groups of 8 ch
Rating/Type	24V, max 0.5A d.c., transistor, current sink / short-circuit-proof

#### DO815

No. of channels / Grouping	8 / 2 groups of 4 ch
Rating/Type	24V, max 2A d.c. , transistor, current source / short-circuit-proof

#### DO820

No. of channels / Grouping	8 / 8
Rating/Type	5-250V, max 3A a.c./d.c., relay (N.O.)

#### DO821

No. of channels / Grouping	8 / 8
Rating/Type	5-250V, max 3A a.c./d.c., relay (N.C.)

## DO890, with intrinsic safety & wire-fault detection

No. of channels/Grouping	4 / Separate returns
Rating/Type	Load 150 - 5000Ω, 11V @ 40mA current source / short circuit-proof

### ■ Analog input modules

#### AI801

No. of channels	8, single-ended
Rating/type	0(4)-20mA / 12 bits

#### AI810

No. of channels	8, single-ended
Rating/type	0(4)-20mA / 0(2)-10V / 12 bits

## AI820, differential input

No. of channels	4
Rating/type	0(1)-5V, ±0(2)-10V, ±0(4)-20mA / 14 bits+sign

## AI830, RTD input

No. of channels	8
Rating/type	Pt100, Ni100, Ni120, Cu10, resistor 0-400Ω / 14 bits / 3-wire

## AI835, TC input

No. of channels	8 (7+ ref. junction)
Grouping	Separate returns
Rating/type	TC types B, C, E, J, K, N, R, S, T, -30 ...75mV / 15 bits

## AI890, intrinsic safety

No. of channels	8, single-ended
Rating/Type	0(4)-20mA / 12 bits Transmitter power supply

## AI895, intrinsic safety & HART interface

No. of channels	8, single-ended
Rating/Type	4-20mA / 12 bits Transmitter power supply

### ■ Analog output modules

#### AO801

No. of channels / Grouping	8 / Common return
Rating/type	0(4)-20mA / 12 bits
Load	<750Ω

#### AO810

No. of channels / Grouping	8 / Common return
Rating/type	0(4)-20mA / 14 bits
Load	850Ω (short-circuit-proof)

## AO820, isolated output

No. of channels / Grouping	4 / Separate returns
Measuring range	±0(2)-10V, ±0(4)-20mA
Resolution	12 bits+sign
Load	≤500Ω current/≥2kΩ voltage, short-circuit-proof

## AO890, intrinsic safety & wire-fault detection

No. of channels/Grouping	8 / Common return
Rating/Type	0(4)-20mA/ 12 bits
Load	750Ω ( short-circuit-proof)

## AO895, intrinsic safety, with HART interface & wire-fault detection

No. of channels/Grouping	8 / Common return
Rating/Type	4-20mA / 12 bits
Load	750Ω (short-circuit-proof)

### Environmentals and standards

#### Environmental

Temperature range	Max. 55 °C
Protection class	IP20

#### Standards complied with

EMC	EN 50081-2, EN 50082-2, EN 60439-1, EN 50178, EN 60950, EN 61010-1
Fieldbus media	IEC 1158-2
Corrosive gases	ISA Class G2 CSA approval pending
Environmental	14001
Intrinsic safety	Class 1, div. 2 (pending)

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