Network Systems

Rail Family
line INDUSTRIAL

Rail Family

INDUSTRIAL

Rail Family

The Hirschmann Distri-buted Communications Architecture (DCA) descri-bes a robust standards based Ethernet solution for all levels of industrial automation and control, managing and handling information from instru-ments and sensors to con-trol devices that intercom-municate with plant com-puter equipment.

For the process, traffic management and manufacturing industries, this is the time for change and a shift to new technologies. Underpinning all tech-nological trends is the move towards open, transparent commercial instal-lations based on intranet/Internet and Extranet computing models and away from the proprietary systems of the past.

Every part of the process control and automation industry - from embed-ded systems to the Fieldbus Foundation - has recognised the importance of Ethernet and TCP/IP. Ethernet has become the dominant network tech-nology at the controller and supervisory level. Every Controller, PLC and DCS vendor has an Ethernet interface and it is now moving downwards towards the device and I/O level.

There is no longer any reason why Ethernet cannot be used to build deter-ministic fieldbus solutions that are cost-effective and open. Since Ethernet is already the network choice for business computing, its presence at the control level will make sensor to boardroom integration a reality.

Although the Ethernet standard used in the field is the same as that used in the office, its industrial implementation is considerably different. All of the Hirschmann Industrial Line products are designed for industry. DIN rail mounting is standard in the field, as are dual 24V DC power rails. Dual homing and redundancy features, fundamental to mission critical industrial networking, achieve link recovery in less than 300 msec, orders of magnitude faster than the 'spanning tree' technique common in the enterprise office LAN.

Industrial Line products are built to withstand environmental extremes. Electromagnetic fields, corrosive fluids and gases, high levels of pollution and large variations in temperature or mechanical strain are simply not a problem.

Through the high degree of quality, their robust manufacture and the conformance to standards, Hirschmann Industrial Line products achieve an above average life span. Up to 1 million working hours at full power is the norm.
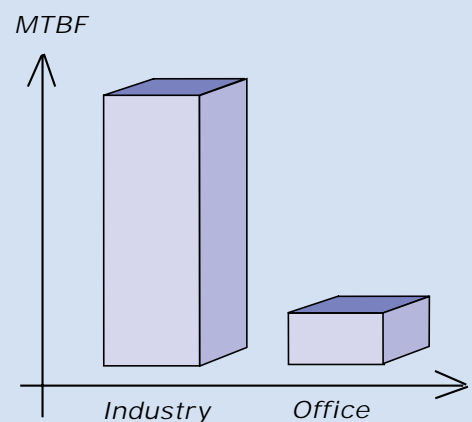
The demand for fieldbus technology is being driven by manufacturing end users' desire to move away from older, centralised plant control strategies to distributed control in the field.

Most factory floor data collection applications use a batch approach, where data is transmitted at the end of the shift or other low usage times of day. New networking technologies will change this model to realtime, with factory floor information being continually and automatically collected and analysed - without operator intervention. The factory floor operation will increasingly be directly connected in a client/server model to host computers and servers.

Imagine the impact of every shopfloor worker having the equivalent of a handheld RF-capable network browser at his or her disposal to query any database or access devices on the network. These operational online continuous nodes will be another bandwidth consumer, raising traffic levels significantly.

Hirschmann has specifically addressed current concerns about Ethernet's lack of determinism and redundancy, allowing Ethernet to be adopted as the control network of choice. Control suppliers are moving towards open systems by taking advantage of the new technologies and incorporating them into their control systems.

End users want an enabling technology that provides true device inter-operability, enhanced field-level control and reduced installation costs.
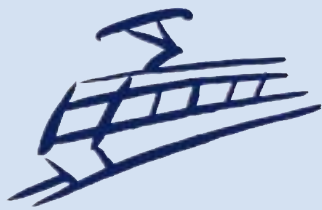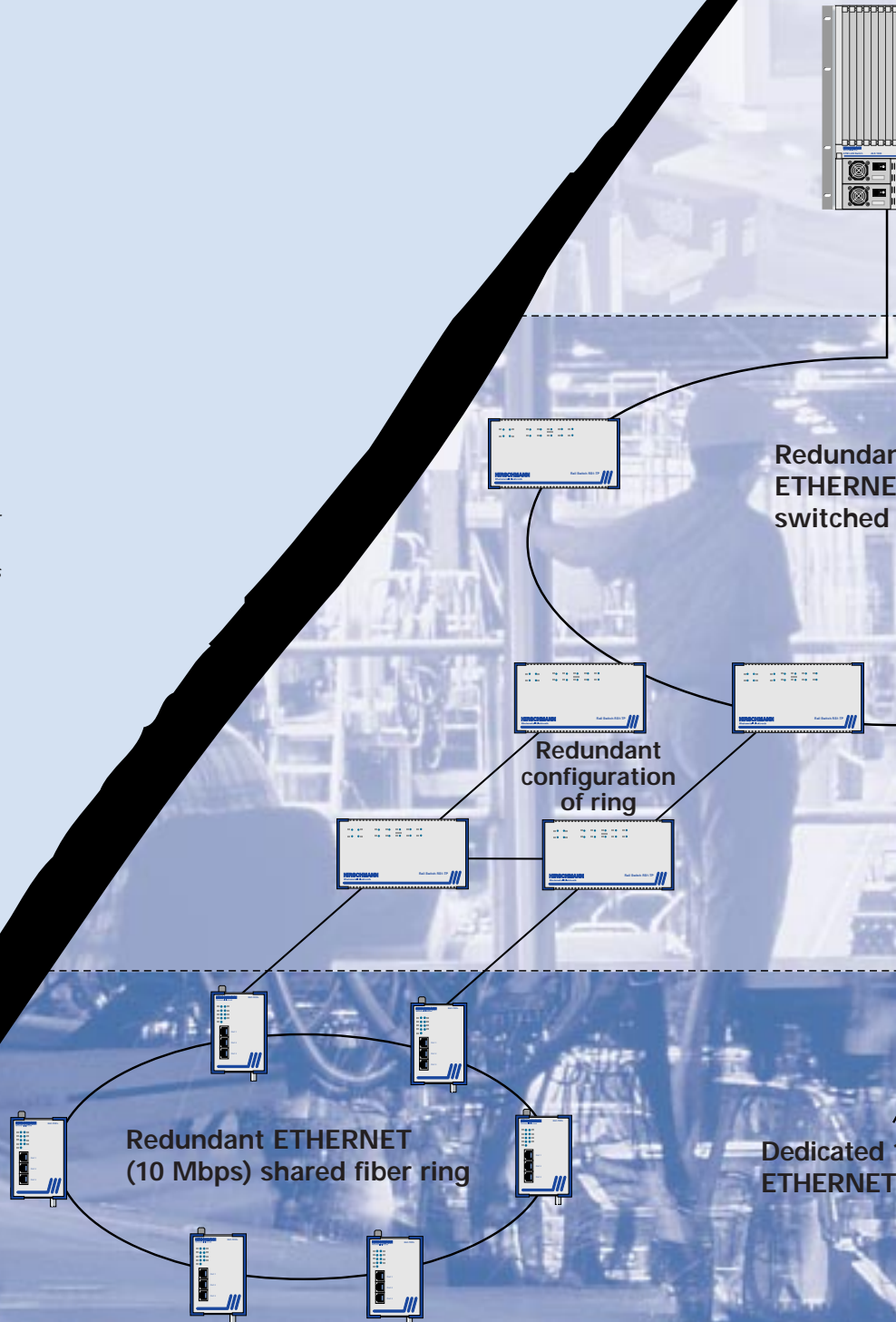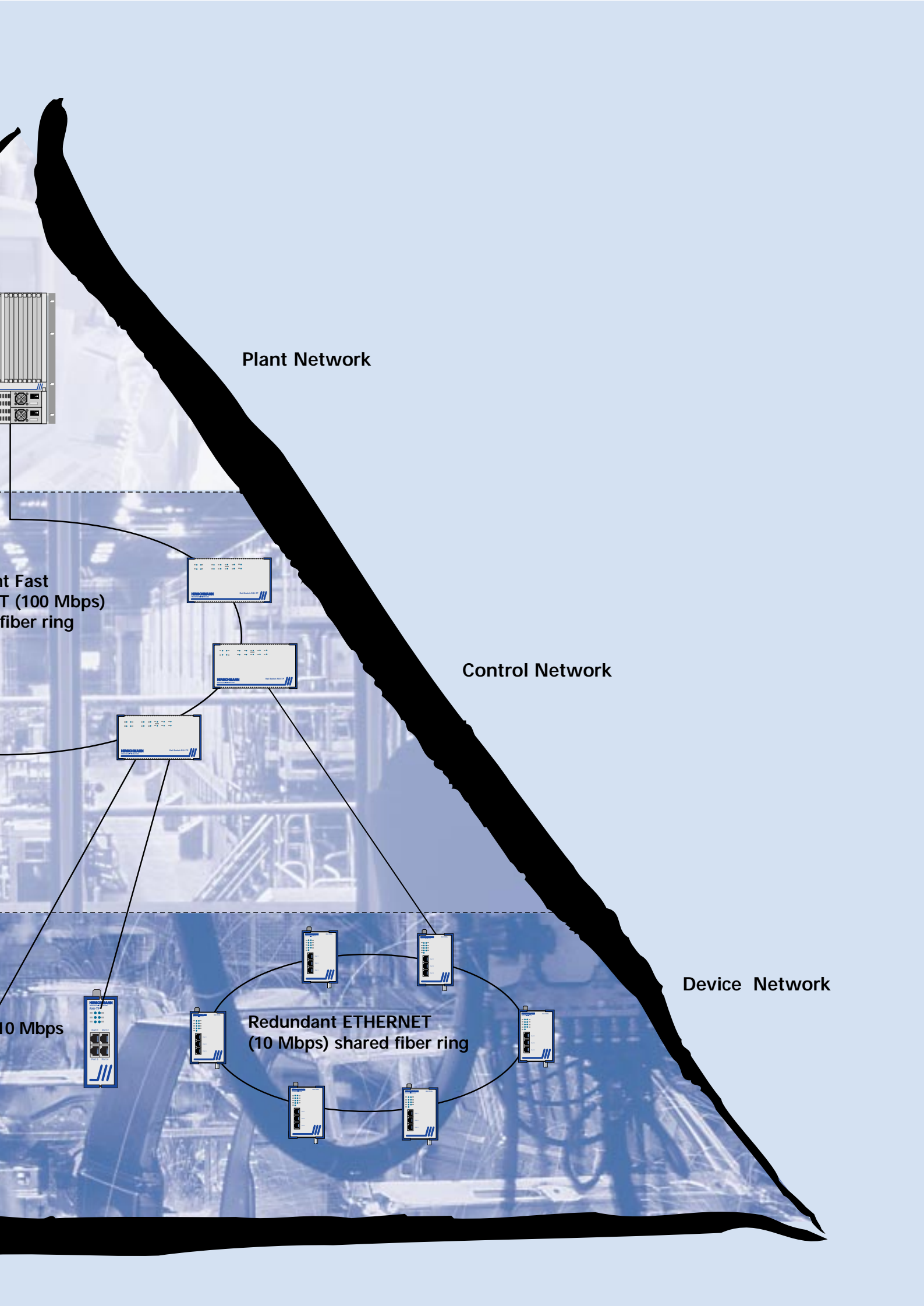
Industrial Network

Industrial Communications

Networks exist to support the needs of the factory and are the lifeblood of the manufacturing process. However, it seems all this transferring data around between the differnt layers of the current factory floornetwork is becoming too complex.
Hirschmann solves this dilemma. Instead of viewing factory networks as independent layers (Plant, Controll and Device), they are viewed as a single resource for data streams prioritised by application needs. By viewing factory traffic as layered data streams, it is possible to forward data using a set of rules that applies to all layers. Instead of compromising between the different capabilities of the differnet layers of today´s factory network, managers can use them fully.

Redundar ETHERNE switched

Redundant configuration of ring

Redundant ETHERNET (10 Mbps) shared fiber ring

Dedicated ETHERNET

Plant Network

t Fast
T (100 Mbps)
fiber ring

Control Network

Device Network

0 Mbps

Redundant ETHERNET
(10 Mbps) shared fiber ring

Rail Hub Family

- **Rugged, heavy-duty design**
- **Fault tolerant by means of redundant voltage supply**
- **Ultimate reliability due to no-fan operation**
- **Fault tolerant Redundant ring structure**
- **Flexible topology structures (Line-Ring-Star)**
- **Easily installed on a standard DIN Rail and simple maintenance**
- **Signaling contacts for function control (e.g. to PLC´s)**
- **Operating temperature from 0ºC to +60ºC (32ºF to 140ºF)**

The **Rail Hub Family** provides you with a flexible and cost-effective solution for designing ETHERNET networks in compliance with IEEE 802.3 based on fiber optic and copper technology. It is especially suitable for use in a harsh industrial environment.

With the **Rail Hubs** you can configure small to medium sized networks easily and cost-effectivly. An important feature is the fast media redundancy in an optical ring structure. The failure of a fiber optic cable or a Rail Hub will be recognized instantly (< 20 ms). By switching to the redundant fiber optic link operation will continue without any loss of data.

An additional benefit of the Hirschmann ring topology is network expansion which can be performed without impacting the network availability.

The Rail Hubs provide three twisted pair and two fiber optic ports integrated into a compact and rugged chassis. This allows you to connect up to three terminals, PLC´s, I/O modules or twisted pair segments. Various network structures can be realized with the Rail Hubs: Line structures via fiber optic or twisted pair and redundant optical ring structures via the fiber optic ports. The Rail Hubs can also be combined with fiber optic interface cards of the ASGE-, ALS and AMC families for integration at the plant network.

The Rail hubs are available in two versions: The **OTP3-FL2** offers you three twisted pair ports with DB9 connectors, the **RH1-TP/FL** provides three twisted pair ports with standard RJ45 connectors.

The integrated fast media redundancy in an optical ring structure guarantees you a fault-tolerant network. The Rail Hubs can be easily fixed on a standard DIN Rail without any further configurations. The 24 V DC operating voltage is supplied over the terminal block and can also be configured for redundancy.

Integrated into the terminal block is a signaling contact which sends fault messages of the Rail Hub as High/Low signal, e.g. to an I/O block of a PLC or any other control device. This is activated as soon as any event occurs in the Rail Hub, i.e., voltage supply malfunction or at least one fiber optic or twisted pair port reports a faulty link status.

Built-in LED´s indicate collisions, link status, power failure and data receipt for on-site diagnostics.

Product	Order No.:
OTP3-FL2	**943 440-001**
Technology	ETHERNET 10 Mbit/s
Interfaces	3 10BASE-T ports with DB9 connectors (shielded)
	2 10BASE-FL ports with BFOC connectors
	1 x 5 pin pluggable terminal block

Product	Order No.:
RH1-TP/FL	**943 613-001**
Technology	ETHERNET 10 Mbit/s
Interfaces	3 10BASE-T ports with RJ45 connectors (shielded)
	2 10BASE-FL ports with BFOC connectors
	1 x 5 pin pluggable terminal block
Operating voltage	18 to 32 V DC, Safety low voltage (redundant inputs)
Power consumption	typ. 160 mA, max. 280 mA
Maximum range	OTP3-FL2; RH1-TP/FL: 50/125µm-fiber: max. 2.600 m (max. 8.500 ft) > 11 dB Link Budget 62,5/125µm-fiber: max. 3.100 m (max. 10.000 ft) > 14 dB Link Budget TP-line length: max. 100 m (max. 330 ft)
LED indicators	Power, Data, Collision, Link status per port
Mechanical construction	
- Dimensions W x H x D	80 x 140 x 85 mm (31.5 x 55.1 x 33.5 in)
- Weight	900 g (2 lb)
- Operating temperature	0 °C to +60 °C (32° F to 140° F)
- Operating humidity	10% to 95% (non condensing)
- Enclosure	IP 30
- Approvals	CE, cUL, FCC, FM
Scope of delivery	Rail Hub OTP3-FL2 or RH1-TP/FL Terminal block for supply voltage Description and operating instructions

OTP3-FL2

RH1-TP/FL

- **Rugged, heavy-duty design**
- **Fault tolerant by means of redundant voltage supply**
- **Ultimate reliability due to no-fan operation**
- **Fast and cost-effective expansion of your network**
- **Easily fixed on a standard DIN Rail and simple commissioning**
- **Signaling contacts for function control (e.g. to PLC´s)**
- **Operating temperature from 0ºC to +60ºC (32ºF to 140ºF)**

The **Rail Hub** **RH1-TP** allows you the fast and cost-effective expansion of your network. It has four twisted pair ports. Via twisted pair you can connect up to four devices or further twisted pair segments.

The Rail Hubs can be easily fixed on a standard DIN Rail without any further configurations. The 24 V DC operating voltage is supplied over the terminal block and can also be configured for redundancy.

Integrated into the terminal block is a signaling contact which sends fault messages of the Rail Hub as High/Low signal, e.g. to an I/O block of a PLC or any other control device. This is activated as soon as any event occurs in the Rail Hub, i.e., voltage supply malfunction or at least one twisted pair port reports a faulty link status.

Built-in LED´s indicate collisions, link status, power failure and data receipt for on-site diagnostics.

Control Network

Robot

Operator station

PLC

Soft-PLC

I/O - Block

Redundant ETHERNET (10 Mbps) shared fiber ring
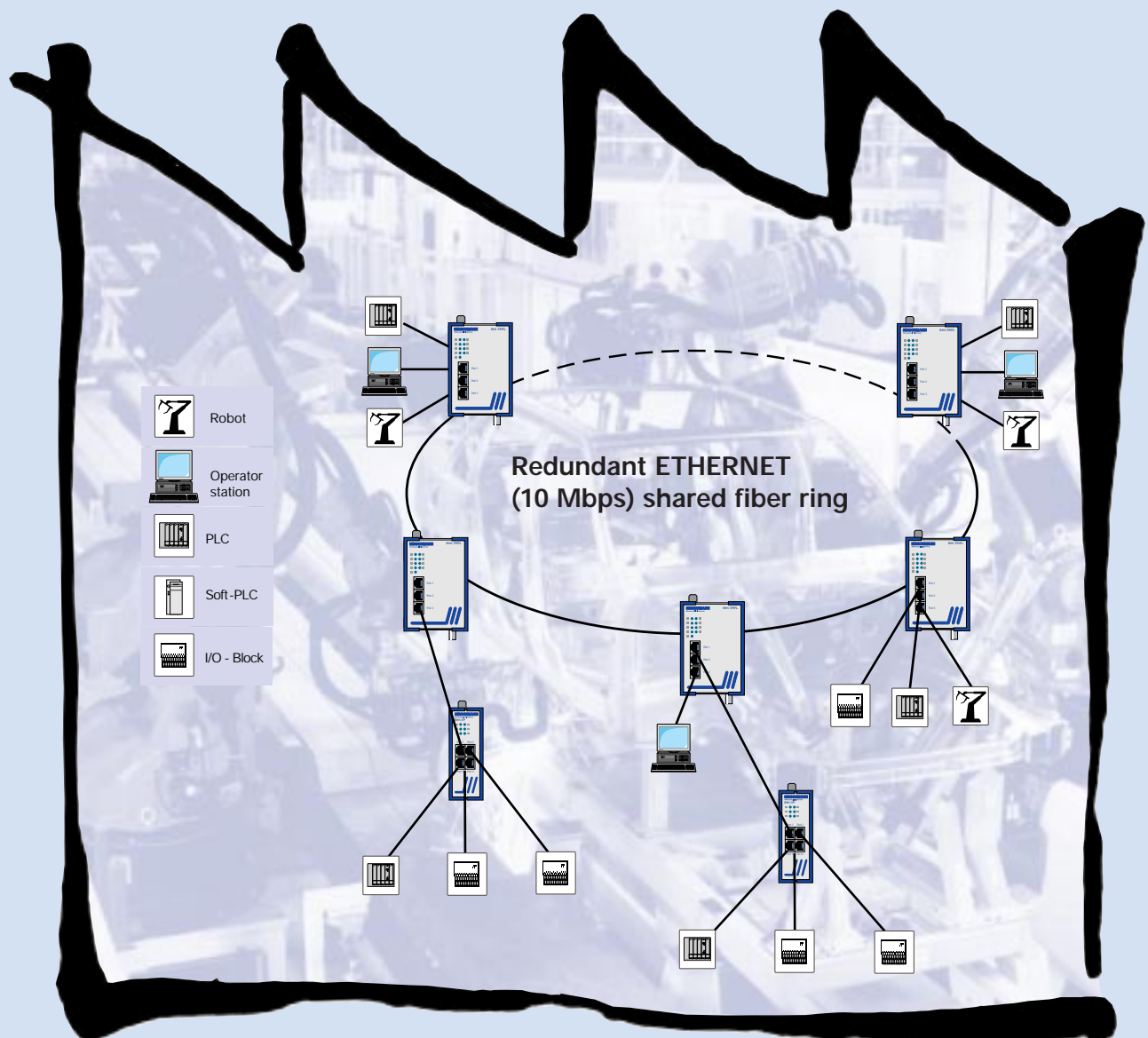
Product	Order No.:
RH1-TP	**943 639-001**
Technology	ETHERNET 10 Mbit/s
Interfaces	4 10BASE-T ports with RJ45 connectors (shielded) 1 x 5 pin pluggable terminal block
Operating voltage	DC 18 to 32 V Safety low voltage (redundant inputs)
Power consumption	typ. 90 mA
Maximum range	TP-line length: max. 100 m (max. 330 ft)
LED indicators	Power, Data, Collision, Link status per port
Mechanical construction	
- Dimensions W x H x D	40 x 125 x 80 mm (15.8 x 49.2 x 31.5 in)
- Weight	520 g (1.2 lb)
- Operating temperature	0 °C to +60 °C (32° F to 140° F)
- Operating humidity	10% to 95% (non condensing)
- Enclosure	IP 30
- Approvals	CE, cUL, FCC, FM
Scope of delivery	Rail Hub RH1-TP Terminal block for supply voltage Description and operating instructions

RH1-TP

Rail Switch Family

- **Rugged, heavy-duty design**
- **Fault tolerant by means of redundant voltage supply**
- **Ultimate reliability due to no-fan operation**
- **Fault tolerant Redundant ring structure - Fast Media redundancy (< 300 ms)**
- **Very high cascading depth/ network expansion (up to 50 Switches)**
- **Operating temperature from 0°C to +60°C (32° F to 140° F)**
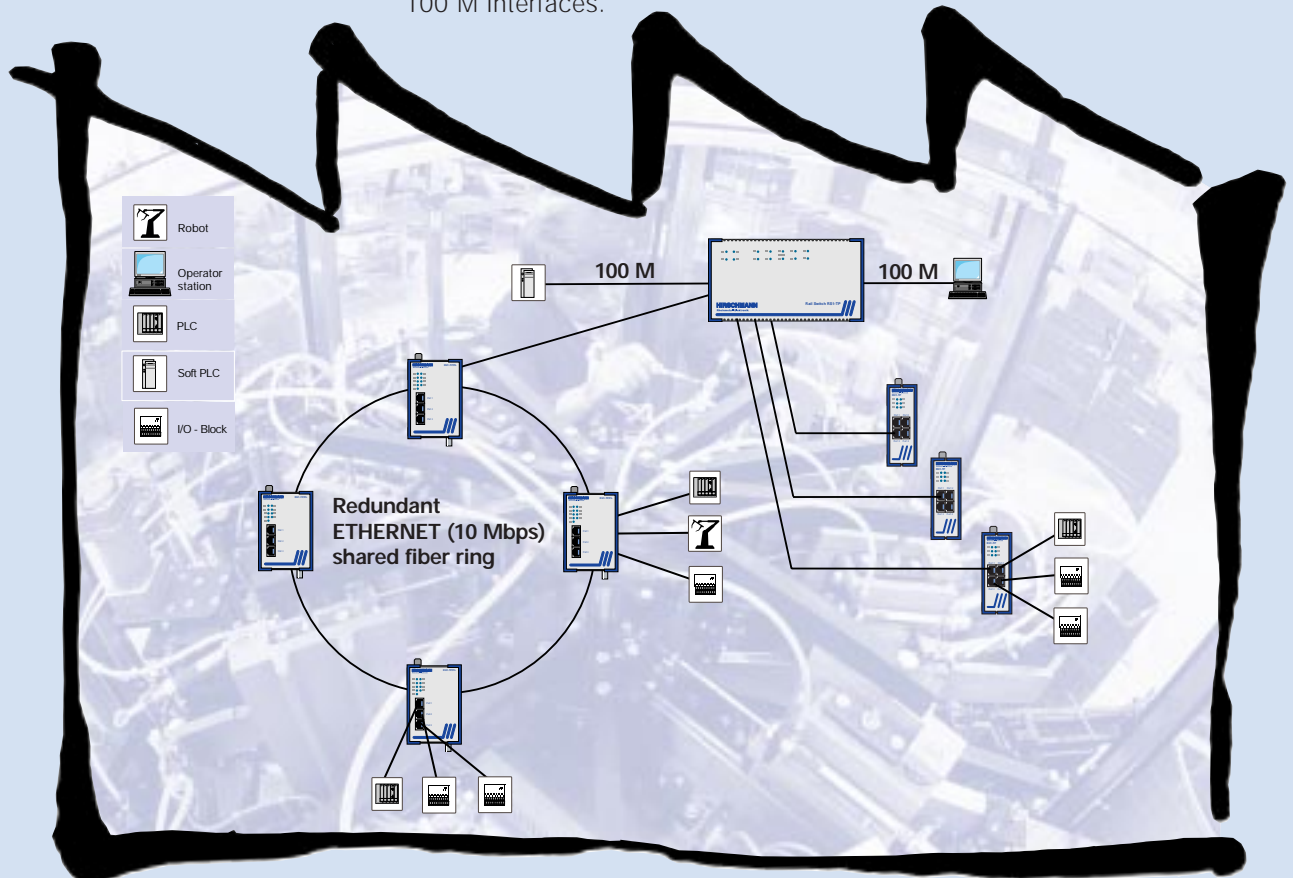- **Cost effectiv DIN-Rail mounting**

The **Rail Switch Family** provides you with a flexible and cost-effective solution for designing ETHERNET networks in compliance with IEEE 802.3 based on fiber optic and copper technology. It is especially suitable for use in a harsh industrial environment.

With the Rail Switches you can configure medium to large sized networks easily and cost-effective. An important feature is the fast media redundancy in an optical ring structure. The failure of a fiber optic cable or a Rail Switch will be recognized promptly (< 300 ms). By switching to the redundant fiber optic link operation will continue without any loss of data. The integrated fast media redundancy guarantees you a fault-tolerant network.

An additional benefit of the Hirschmann ring topology is network expansion, which can be performed without impacting the network availability. The Rail Switches offers a very high network expansions of up to 2000 km in a ring structure and several thousands of kilometers in a bus structure.

The Rail Switches provide you with ten switched ports integrated into a compact and rugged chassis.

They are available with eight twisted pair ports based on 10BASE-T to connect terminals, PLC´s, I/O blocks or other twisted pair segments and two 100 Mbit/s ports based on the Fast Ethernet Standard. The Rail Switches are available in four versions offering combinations of twisted pair and multimode as well as singlemode 100 M Interfaces.

Robot

Operator station

PLC

Soft PLC

I/O - Block

100 M   100 M

Redundant
ETHERNET (10 Mbps)
shared fiber ring

Product	Order No.:
RS1-FX/FX	**943 606-031**
Interfaces	8 10BASE-T ports with RJ45 connectors (shielded)
	2 100BASE-FX ports with SC connectors
	1 x 5 pin pluggable terminal block
Product	Order No.:
RS1-TX/TX	**943 606-001**
Interfaces	8 10BASE-T ports with RJ45 connectors (shielded)
	2 100BASE-TX ports with RJ45 connectors
	1 x 5 pin pluggable terminal block
Product	Order No.:
RS1-TX/FX	**943 606-032**
Interfaces	8 ports based on 10BASE-T with RJ45 connectors (shielded)
	1 100BASE-TX port with RJ45 connector
	1 100BASE-FX-multimode port with SC connector
	1 x 5 pin pluggable terminal block
Product	Order No.:
RS1-TX/FX-SM	**943 606-033**
Interfaces	8 10BASE-T ports with RJ45 connectors (shielded)
	1 100BASE-TX port with RJ45 connector
	1 100BASE-FX-singlemode port with SC connectors
	1 x 5 pin pluggable terminal block
Technology	ETHERNET 10 Mbit/s and Fast ETHERNET 100 Mbit/s
Operating voltage	DC 18 to 32 V Safety low voltage (redundant inputs)
Power consumption	max. 500 mA/max. 0.9 A
Maximum range	FX-multimode port:
	50/125µm-fiber: max. 3.000 m (max. 8.500 ft)
	> 11 dB Link Budget
	62,5/125µm-fiber: max.3.000 m (max. 10.000 ft)
	> 14 dB Link Budget
	FX-singlemode port:
	10/125 µm-fiber: max. 40.000 m (max. 130.000 ft)
	> 11 dB Link Budget
	TP-line length:
	max. 100 m (max. 330 ft)
LED indicators	Power, Data, Collision, Link status per port
Mechanical construction	
- Dimensions W x H x D	209 x 140 x 85 mm (82.3 x 55.1 x 33.5 in)
- Weight	1.4 Kg (3.2 lb)
- Operating temperature	0 °C to +60 °C (32° F to 140° F)
- Operating humidity	10% to 95% (non condensing)
- Enclosure	IP 20
- Approvals	CE, cUL, FCC, FM
Scope of delivery	Rail Switch RS1-xx/xx or RM1
	Terminal block for supply voltage
	Description and operating instruction

RS 1

- **Fault tolerant redundant ring structure - Fast Media Redundancy (< 300 ms)**
- **Fault tolerant by means of redundant voltage supply**
- **ultimate reliabitity due to no fan operation**
- **Signaling contacts for function control (e.g. to PLC´s)**

The **Redundancy Manager RM1** has been specifically designed for use in redundant ring structures together with the Rail Switches.
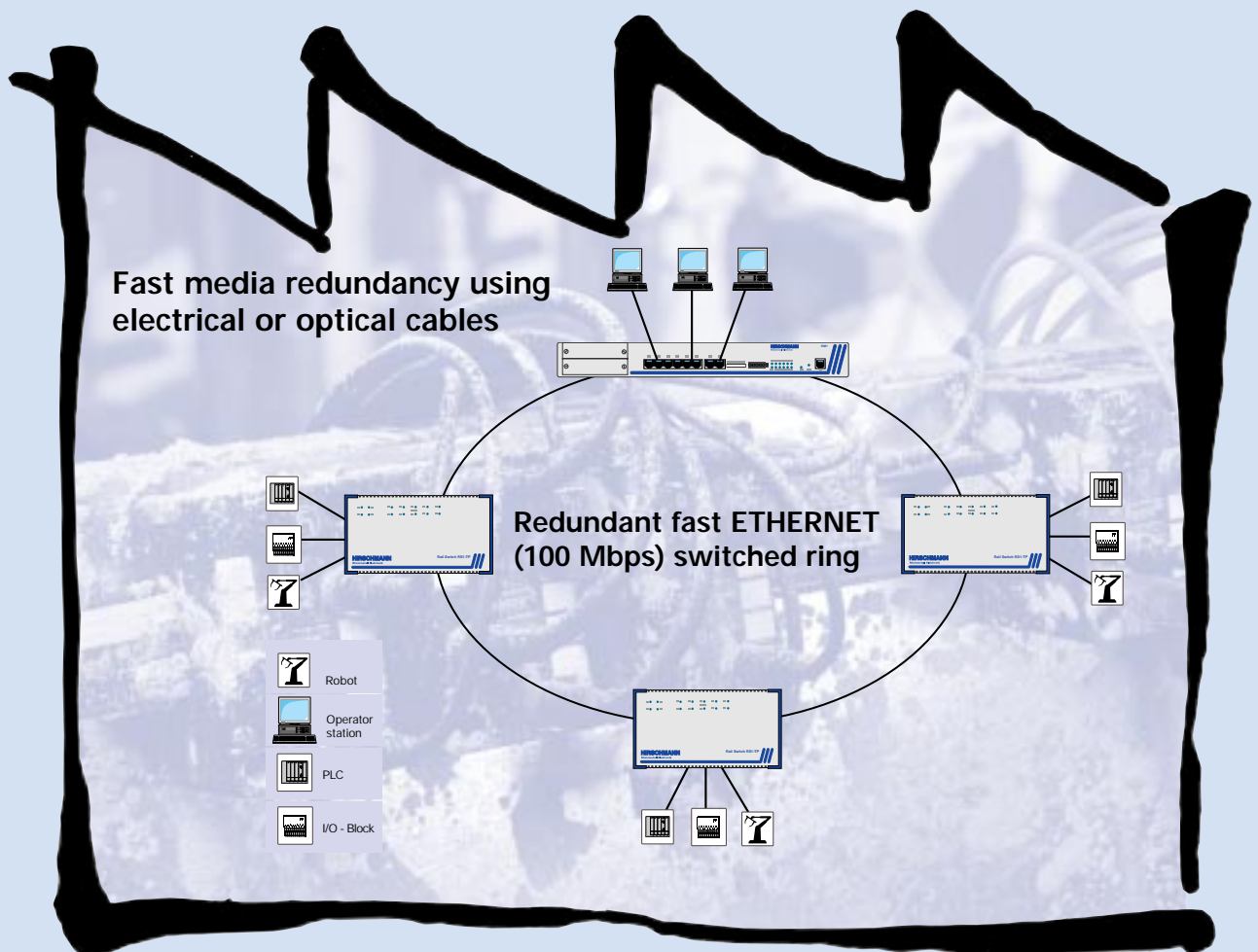
The control of the redundant ring is handled by the Redundancy Manager. It supervises the ring and is responsible for detection and dynamic bypass of network fault, all within **300 ms.**

The Redundancy Manager is built into a 19" chassis and suitable for use in control rooms.

It provides eight twisted pair ports based on 10BASE-T to connect operator stations, PLC´s, I/O blocks or other twisted pair segments as well as two free slots for 100 Mbit/s modules. You can select between modules for 100BASE-TX and 100BASE-FX.

The 24 V DC operating voltage is supplied over the terminal block and can also be configured for redundancy.

Integrated into the terminal block is a signaling contact which sends fault messages of the Redundancy Manager as High/Low signal, e.g. to an I/O block of a PLC or any other control device. This is activated as soon as any event occurs in the Redundancy Manager, i.e., voltage supply malfunction or at least one fiber optic or twisted pair port reports a faulty link status.

Fast media redundancy using electrical or optical cables

Redundant fast ETHERNET (100 Mbps) switched ring

Robot

Operator station

PLC

I/O - Block

| Product	Order No.:
RM1	**943 632-001**
Interfaces	8 10BASE-T ports with RJ45 connectors (shielded) 2 free slots for 100BASE-X-Modules 1 x 5 pin pluggable terminal block
100BASE-X-Modules:	
ETSXM-01TP(FE)	**943 567-001**
Interface	1 100BASE-FX port Full duplex with RJ45 connector
ETSXM-01MM(FE)	**943 568-001**
Interface	1 100BASE-FX port Full duplex with SC connectors
Technology	ETHERNET 10 Mbit/s and Fast ETHERNET 100 Mbit/s
Operating voltage	DC 18 to 32 V Safety low voltage (redundant inputs)
Power consumption	max. 500 mA / max. 0.9 A
Maximum range	FX-multimode port: 50/125µm-fiber: max. 3.000 m (max. 8.500 ft) > 11 dB Link Budget 62,5/125µm-fiber: max. 3.000 m (max. 10.000 ft) > 14 dB Link Budget FX-singlemode port: 10/125 µm-fiber: max. 40.000 m (max. 130.000 ft) > 11 dB Link Budget
TP-line length:	max. 100 m (max. 330 ft)
LED indicators	Power, Data, Collision, Link status per port
Mechanical construction - Dimensions W x H x D	434 x 44 x 279 mm (170.9 x 17.3 x 109.8 in)
- Weight	3.6 kg (8 lb)
- Operating temperature	0 °C to +40 °C (32° F to 140° F)
- Operating humidity	10% to 95% (non condensing)
- Enclosure	IP 30
- Approvals	CE, cUL, FCC, FM
Scope of delivery	Rail Switch RS1-xx/xx or RM1 Terminal block for supply voltage Description and operating instruction

RM1

Rail Switch Family

Highest fault tolerant double redundancy

Control Room
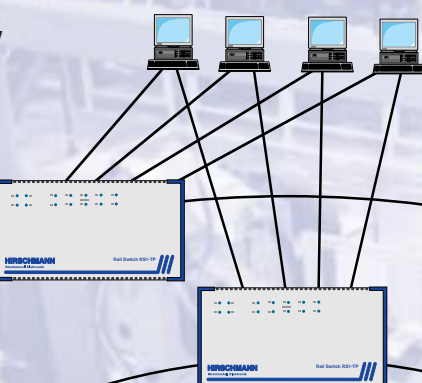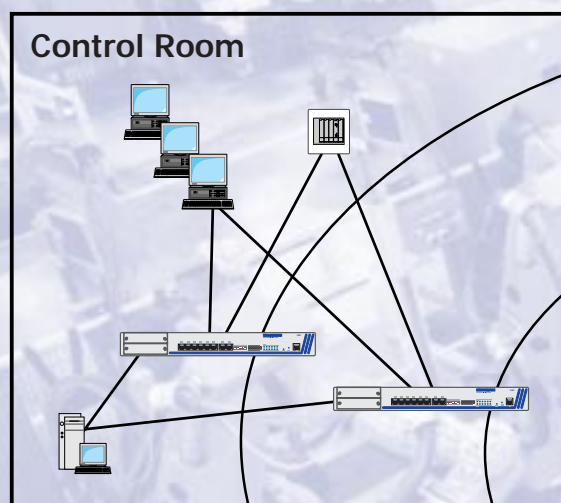
Dual Fast ETHERNET (100 Mbp
switched ring solution
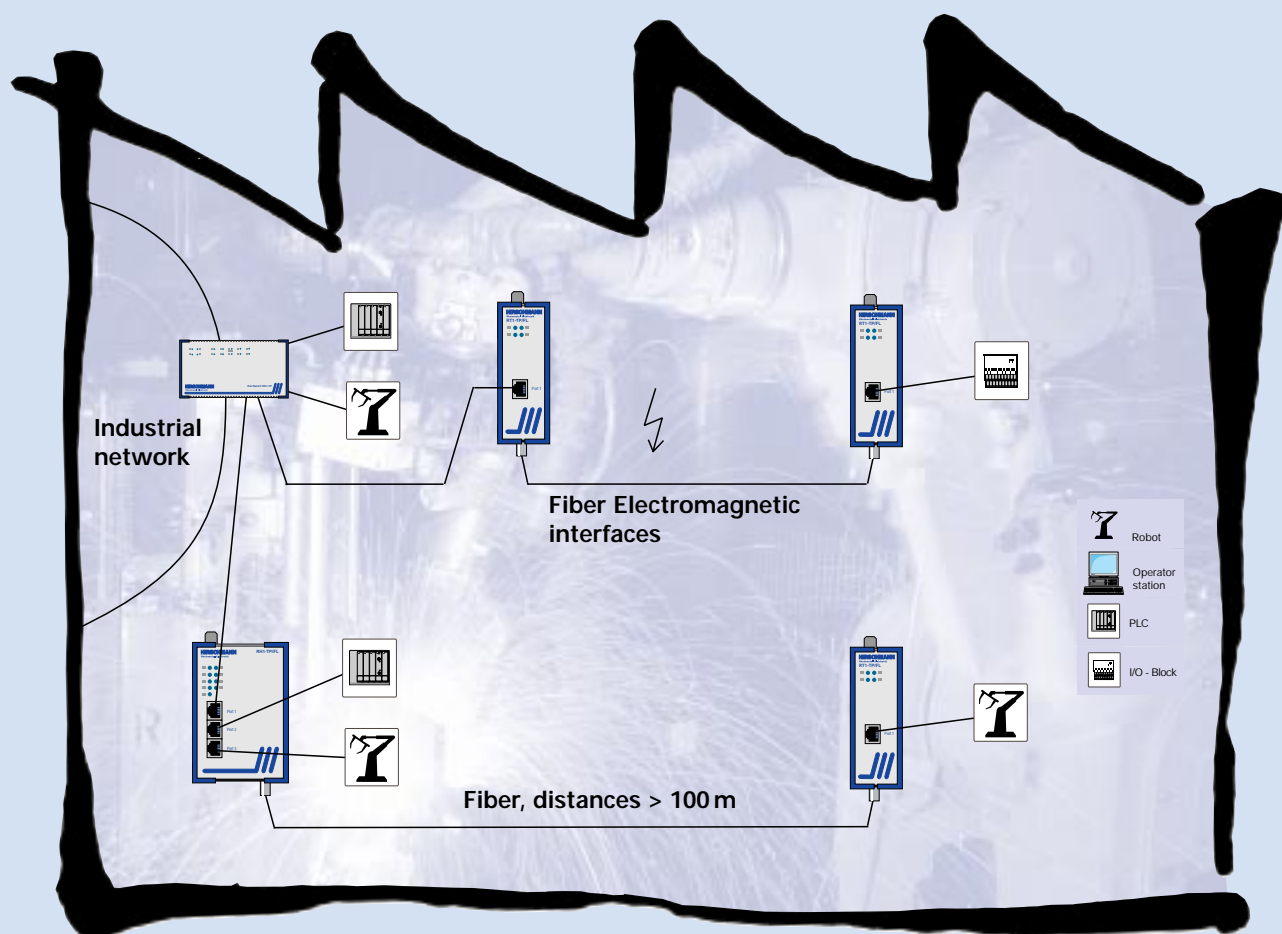
ETHERNET
Based
Remote I/O
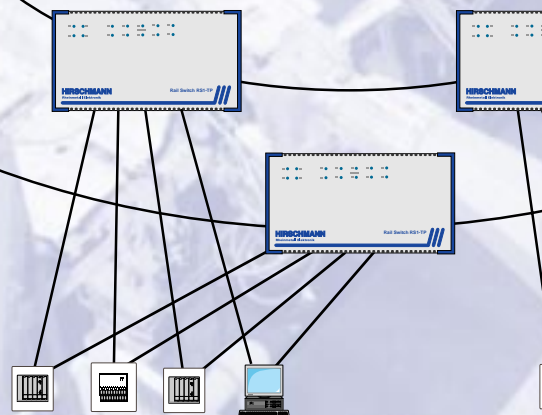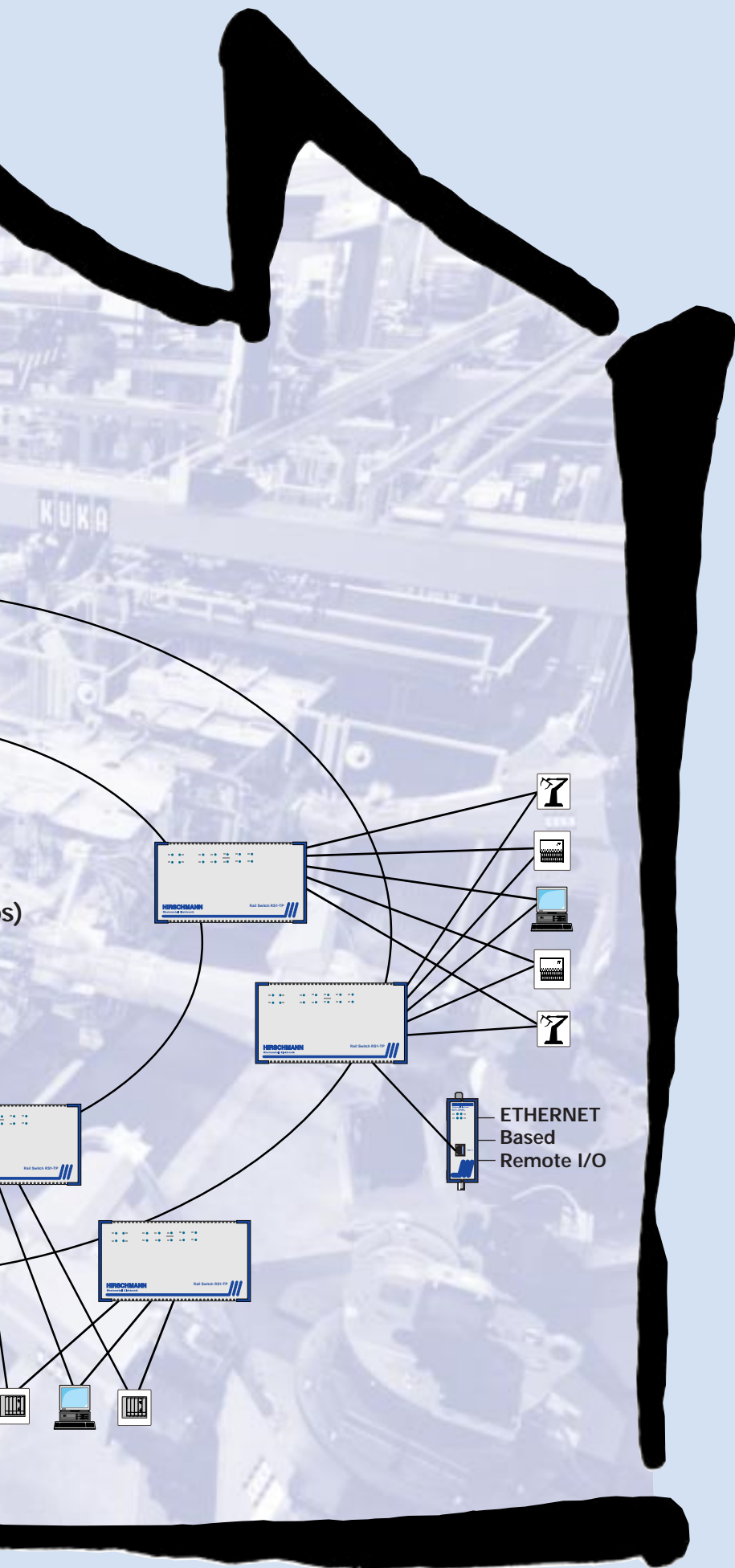
Created from the start as mission-critical switches, Hirschmann´s Industrial-Line switches benefit from no single point of network failure, either physically or logically, when configured in „single ring" topology. Incorporating high levels of resilience as standart, the switches create an inherently „bulletproof" Ethernet network. Depending on how important tfe process application is, the level of resilience in the overall network can be matched to meet further continuity requirements. For example, where a controller has dual redundant network interface cards, each card could connect to separate switches on the same resilient fibre ring or, if double redundancy is needed, a second ring as shown here could be added.

- *Rugged, heavy-duty design*
- *Fault tolerant by means of redundant voltage supply*
- *Ultimate reliability due to no-fan operation*
- *Connection at single device over fiber up to 2 km*
- *Half and full duplex capable*
- *Easily installed on a standard DIN Rail and simple maintenance*
- *Signaling contacts for function control (e.g. to PLC´s)*
- *Operating temperature from 0ºC to +60ºC (32°F to 140°F)*

The **Rail Transceiver** is the perfect solution for a fast and cost-effective connection of remote devices. Secure transmission is provided in areas of high electromagnetic interference. Furthermore they provide electrical Isolation. The Rail Transceiver Family provides you with a flexible and cost-effective solution for designing ETHERNET networks in compliance with IEEE 802.3 based on fiber optic and copper technology. It is especially suitable for use in a harsh industrial environment. The Rail Transcei-ver has one twisted pair (10BASE-T) and one fiber optic port (10BASE-FL) integrated into a compact and rugged chassis. The direct connection allows you to extend your network beyond the limitation of existing 100 m twisted-pair structures. Due to its inherent immunity to induction, capacitance and galvanically coupled electromagnetic interference, fiber optic technology is ideally suited for industrial applications. The Rail Transceivers can be easily fixed on a standard DIN Rail without any further configurations. The 24 V DC operating voltage is supplied over the terminal block and can also be configured for redundancy. Integrated into the terminal block is a signaling contact which sends fault messages of the Rail Transceiver as High/Low signal, e.g. to an I/O block of a PLC or any other control device. This is activated as soon as any event occurs in the Rail Transceiver, i.e., voltage supply malfunction or at least a fiber optic or twisted pair port reports a faulty link status. Built-in LED´s indicate collisions, link status, power failure and data receipt for on-site diagnostics.

Industrial network

Fiber Electromagnetic interfaces

Robot

Operator station

PLC

I/O - Block

Fiber, distances > 100 m

Product	Order No.:
RT1-TP/FL	**943 633-001**
Technology	ETHERNET 10 Mbit/s
Interfaces	1 10BASE-T port with RJ45 connector (shielded)
	1 10BASE-FL port with BFOC connectors
	1 x 5 pin pluggable terminal block
Operating voltage	DC 18 to 32 V Safety low voltage (redundant inputs)
Power consumption	typ. 90 mA
Maximum range	50/125µm-fiber:
	max. 2.600 m (max. 8.500 ft)
	> 11 dB Link Budget
	62,5/125µm-fiber: max. 3.100 m (max. 10.000 ft)
	> 14 dB Link Budget
	TP-line length: max. 100 m (max. 330 ft)
LED indicators	Power, Data, Collision, Link status per port
Mechanical construction	
- Dimensions W x H x D	40 x 140 x 80 mm (15.8 x 55.1 x 31.5 in)
- Weight	520 g (1.2 lb)
- Operating temperature	0 °C to +60 °C (32° F to 140° F)
- Operating humidity	10% to 95% (non condensing)
- Enclosure	IP 30
- Approvals	CE, cUL, FCC, FM
Scope of delivery	Rail Transceiver RT1-TP/FL
	Terminal block for supply voltage
	Description and operating instructions

RT1-TP/FL

Documentation

The CD-Rom manuals contain the detailed technical data of the
Hirschmann manuals in German and English.
Besides the DIN Rail industrial networking solutions described in this bro-
chure, Hirschmann offer fully managed, standards compliant enterprise
networking solutions; utilizing Ethernet, Token Ring, FDDI and for the ISDN
and X.21:

Brochures	Describes	Order No.
ASGE/MC family	EtherLAN Hubs	280 720-783
AMC family	ETHERNET switching center	280 720-782
ALS family	Advanced LAN switches	280 720-784
HiWay Router family	Access Router	280 720-787
HiWay Hub family	Workgroup Hub	280 720-788
HiWay Switch family	Workgroup Switches	280 720-786
MR family	MultiLAN Switches	280 720-785
Network Management	Management Shells/Agents	280 720-793

Please contact your local Hirschmann Sales representative for more
information on these products.

- Manual for advanced LAN switch
- Manual for ethernet
- Manual for MIKE management
- Manual for MultiMIKE management
- Manual for FDDI
- Manual for Token Ring
- Manual for Bridge/Router insertion module ERISDN
- Manual for FDDI/ethernet - Switch/Router insertion module
- Manual for FCMA management
- Manual for MultiLAN switch
- User guide HiWay fast ethernet and ethernet/fast ethernet
  Workgroup switches
- Installation and configuration guide for ATM uplink module
- Installation and configuration guide for FDDI-DAS uplink module
- User manual for HiWay ethernet workgroup hub

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