INTRON-D *plus*
Interface Parameters

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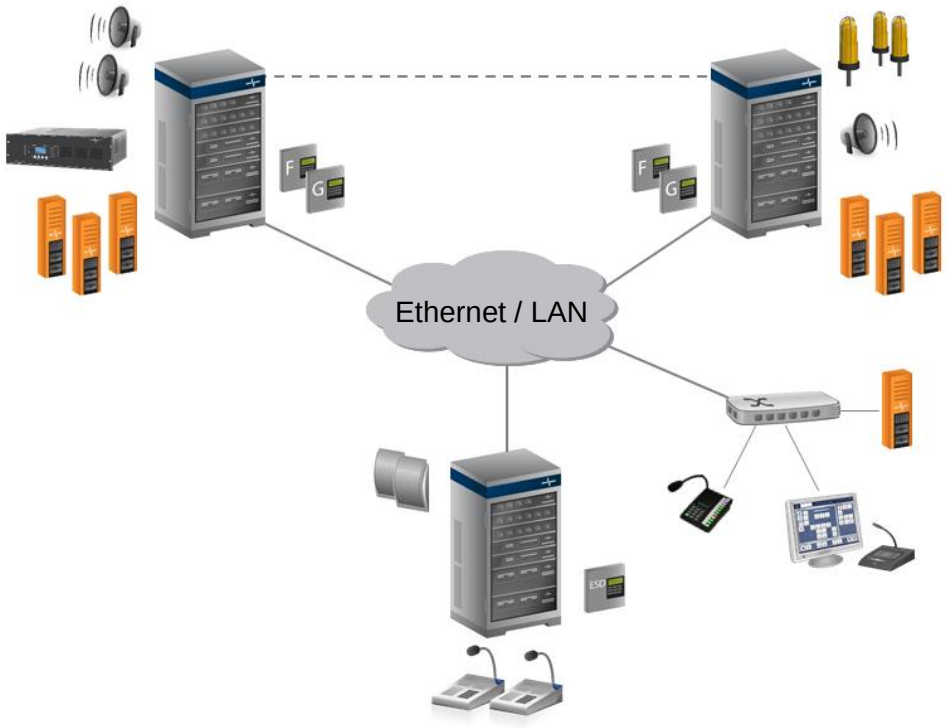
1 Introduction

The INTRON-D *plus* protects people, machines, and the environment and ensures an effective, prioritized and customized flow of communication while delivering the functions and capabilities of three separate systems – intercom, public address and general alarm – in one.



Overview INTRON-D *plus*

Each INTRON-D *plus* system provides numerous interfaces for system networking and connection of external communication and control systems. The 1 DXC 03 / 1 DXC 04 exchange control board provides the network interface.

The modular and flexible system design allows for solutions meeting any type of industrial communication requirements.

This document provides an overview of the parameters which are required for a successful integration of external systems and for normal operation. It can be used as reference during the proposal or project planning phase.

2 Project Information

General

Customer	
Project Number	
System Number [1]	

Contact person

Network		
	Name:	
	Tel.:	
	E-Mail	

Contact person

Telephony		
	Name:	
	Tel.:	
	E-Mail	

INTRON-D *plus*

Number of INTRON-D *plus* systems	
Number of redundant exchange control boards	
Number of INDUSTRONIC IP terminal devices	
PABX SIP connection (Yes/No) [2]	
Modbus TCP connection (Yes/No) [2.3]	
CANopen connection (Yes/No) [2.3]	
SNMP[2]	

[1] If already known

[2] If yes, fill out the data in the corresponding chapter.

[3] If another control protocol is required, note here.

3 Network Requirements

3.1 Overview

The following network requirements must be fulfilled by the customer:

- IPv4 network
- 10/100 MBit/s Ethernet port
- Support of UDP, TCP, SCTP, RTP and RCTP protocols
- Layer-2 or Layer-3 network for system interconnection
  → dedicated Layer-2 network preferred
- Required bandwidths
  - 1 MBit/s basic bandwidth and 200 kBit/s per IP voice connection for system networking
  - For each IP intercom station: 200 kBit/s basic bandwidth and 200 kBit/s per active audio channel
  - For each IP public address unit NPA: 200 kBit/s basic bandwidth and 100 kBit/s per active audio channel
- Support of Quality of Service (QoS)
  - Ideal latency value < 20 ms (max. 50 ms)
  - Jitter: max. 10 ms
- **Optional**: NTP support for access to a central NTP time server
- **Optional:** Network access to administrate the integrated web interface

3.2 Ports and Protocols

The following network ports and protocols can be used by INTRON-D *plus* systems. Some protocols are optional and must be activated beforehand. With several configured Ethernet interfaces (possible from R7.1.0), the port numbers apply to both interfaces.

3.2.1 DXC

Port	Transport		Application	Remarks
7	TCP / UDP	local	Echo	Dustron App
80	TCP	local	HTTP	Web interface
443	TCP	local	HTTPS	Web interface (from R7.0.0)
33040	UDP	local	Proprietary	IP system gateway (from R7.0.0)
33041	TCP	local	Proprietary	IP system gateway (from R7.0.0)
33102	UDP	local	Proprietary	Registration of IP terminal devices
33105	UPD	local	Proprietary	DXC Discovery (from R5.0.0)
33110	UDP	local	Proprietary	DXC Discovery (up to R4.8.9)
33120	TCP	local	Proprietary	TCP connections to IP terminal devices
33199	SCTP	local	Proprietary	DCR: Master/Slave connection
33200	SCTP	local	Proprietary	DXC: Ethernet Interfaces within the system network
33202	SCTP	local	Proprietary	SCTP connections to IP terminal devices
35000 - 44999	UDP	local	RTP / RTCP	Voice transmission

3.2.2 INTRON-D *plus* Interfaces

Port	Transport		Application	Remarks
25	TCP	remote	SMTP	Email
123	UDP	local	NTP	Time synchronization
161	UDP	local	SNMP	SNMP
162	UDP	remote	SNMP	SNMP notification
502	TCP	local	ModbusTCP	Modbus interface, port configurable
5060	UDP	local	SIP	PABX interface
10000 20000	UDP	local	RTP	Voice transmission for SIP (up to R7.0.0)
29000 - 29999	UDP	local	RTP	Voice transmission for SIP (from R7.0.0)
Free ports	TCP	local	CANopen	CANopen interface

3.2.3 INDUSTRONIC IP Terminal Devices

The following network ports and protocols are used by IP terminal devices:

Port	Transport		Application	Remarks
67	UDP	Remote	DHCP	Request to DHCP Server
68	UDP	Local	DHCP	DHCP Client
80	TCP	Local	HTTP	Web interface
123	UDP	Local	NTP	Time synchronization*
33101	UDP	Local	Proprietary	Registration at the DXC
33202 - 34201	SCTP	Local	Proprietary	SCTP connections to the DXC
40000 – 40999	UDP	Local	RTP / RTCP	Voice transmission

* Time synchronization of IP terminal devices is currently controlled via the DXC. There are plans for a separate NTP interface.

NCP intercom station:
The PC intercom station of the NCP series uses UDP as well as TCP connections. The ports used here are allocated by the operating system.

4 Basic Settings

Each INTRON-D *plus* system has an Ethernet interface for:

- System networking
- Web server access for configuration and maintenance
- Connection to INDUSTRONIC IP terminal devices
- PABX connection via SIP protocol
- Data exchange via Modbus TCP
- Data exchange via CANopen
- NMS connection via SNMP

> For INTRON-D *plus* systems with redundant exchange control boards, 3 IP addresses are required per system: two for the exchange control boards and one common (virtual) IP address.

To access and exchange data with the exchange control board the following parameters are required:

General Network Settings

Domain Name		Optional
Name Server		Optional

Network Segment 1

Default Gateway		
Network Mask		

System Name / No.	IP Address 1 DXC 0x	IP Address 1 DXC 0x (Redundant)	Virtual IP Address	Host Name (Optional)
1				
2				
3				
4				
5				
6				
7				
…				

Network Segment 2

Default Gateway		
Network Mask		

System Name / No.	IP Address 1 DXC 0x	IP Address 1 DXC 0x (Redundant)	Virtual IP Address	Host Name (Optional)
1				
2				
3				
4				

If more than 2 network segments are required for an INTRON-D *plus* system network, note down all additional **Network segments N** on a separate sheet!

NTP Time Server and E-Mail Notification:

NTP Server		Optional
Email Server (IP)		Optional
Email Server (Port)		[Default: 25]
Sender Name		[Default = **dxc@ind-cust.loc**]

INTRON-D *plus* supports the **SMTP** protocol only!
INTRON-D *plus* does not support encrypting as in **TLS** or **SSL**!

5 Telephone Connection via VoIP Interface

A VoIP interface can be activated for each INTRON-D *plus* system. This interface allows for the connection of IP-enabled PABX systems via **SIP** protocol.

> We recommend a SIP tie trunk (SIP trunk) between IP PABX and INTRON-D *plus*.

For the IP PABX, it is possible to connect with or without registration at the INTRON-D *plus*. For connections with registration, the INTRON-D *plus* is able to monitor the SIP connection. The INTRON-D *plus* only acts as a SIP registrar (“SIP Server” / “Registration Server” / “User Agent Server”).

The following parameters of the PABX are required for the connection:

PABX Parameters

IP Address		
Port	5060	[preset: 5060]
Peer Name		User name for registration
Transport Protocol		UDP (default) or TCP (from R 6.1.0)
Number of SIP channels (simultaneous connections)		Max. 24 VoIP channels

> The SIP Port 5060 is preset for the INTRON-D *plus* and cannot be changed!

> The INTRON-D *plus* supports the G.711 a-law and µ-law audio codec.

6 Telephone Connection via S0 Telephone Gateway

As an alternative to the direct SIP connection, an additional S0 telephone gateway can be connected to the INTRON-D *plus* VoIP interface. The telephone gateway can be configured for up to four S0 / BRI interfaces that allow a total of 8 simultaneous connections.

> The INTRON-D *plus* SIP interface as well as a corresponding number of VoIP channels must be activated for this kind of connection.

The following parameters are required for the S0 gateway configuration:

Gateway Parameters		
IP address		
Net mask		
Default gateway		
NTP server		Optional

> The exchange control board must be able to reach the IP address of the gateway.

Additionally, the following S0 parameters are required for proper operation of the interface:

S0 Parameters		
Connection type		NT or TE
Protocol		DSS1 or QSIQ
Mode	Point to Point	Point to point or Point to Multipoint

7 INDUSTRONIC IP Terminal Devices

Each INDUSTRONIC IP device provides an Ethernet port for connection to an INTRON-D *plus* system.

INDUSTRONIC's IP terminal devices can be powered either via a separate mains adapter or via PoE (802.3af) if supported by the connected network switch.

> Devices of the NPA series can only be supplied via integrated power supply!

The following parameters are required for each IP terminal device from INDUSTRONIC:

No.	Name	Type	IP address	Network Mask	Default gateway	PoE (Yes/No)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
…						

> The corresponding exchange control board must be able to reach the IP addresses of the IP terminal devices from INDUSTRONIC.

8 Modbus TCP

A Modbus TCP server can be activated for each INTRON-D *plus* system to control different INTRON-D *plus* functions or to provide status information to one or more Modbus TCP Clients.

> Up to 5 Modbus TCP Clients can be used with the INTRON-D *plus*.

Local Modbus TCP Parameters

Network port (TCP) of the DXC		Default port: 502
Time-out		Optional (0s, 4s…)

> The corresponding exchange control board must be able to reach the IP addresses of the Modbus TCP Clients.

The integrated Modbus TCP server supports the following register types

Register	Type of Function	Width	Range of Values
Discrete Input	read only	1 bit	"0" or "1"
Coils	read / write	1 bit	"0" or "1"
Input Registers	read only	16 bit	0 to 65,535

> The assignment of Modbus TCP registers to INTRON-D *plus* functions or status information has to be clarified during the project phase.

The following Modbus functions codes are supported:

02 (02_H)	Read Discrete Input
01 (01_H)	Read Coils
05 (05_H)	Write Single Coil
15 ($0F_H$)	Write Multiple Coils
04 (04_H)	Read Input Registers

9 CANopen

One or more CANopen interfaces can be activated for each INTRON-D *plus* system to control different INTRON-D *plus* functions or to provide status information to one ore more CANopen-based systems.

In addition, the CANopen protocol provides the possibility to assign a voice channel for messages from/to the INTRON-D *plus* system via a digital-analog interface board (8 DIO or NSG).

> The corresponding exchange control board must be able to reach the IP addresses of the CANopen devices.

Parameters of CANopen System 1

IP address(es)		
Network port	19227	[preset: 19227]
Time-out		Optional

Parameters of CANopen System 2

IP address(es)		
Network port	19227	[preset: 19227]
Time-out		Optional

> If more than 2 CANopen interfaces are required, note down all additional **parameters of the CANopen system** on a separate sheet!

The assignment of CANopen registers to INTRON-D *plus* functions or status information has to be clarified during the project phase.

10 SNMP

A SNMP interface (SNMPv2c) can be activated for each INTRON-D *plus* system to obtain different status information of the system via a network management system (NMS). Optionally, SNMP traps (SNMPv2 notifications) can be sent to one or more network management systems.

> The corresponding exchange control board must be able to reach the IP addresses of the network management systems.

SNMP Parameters

IP addresses of the NMS		
(Trap Receiver)		
Password for read access		[Default: public]

> INTRON-D *plus* supports "**GET**" commands only.
> Remote configuration via "**SET**"commands **is not supported** due to security reasons!

The assignment of status information and traps has to be clarified during the project phase.

Document History and Imprint

Version	Author		Approved		Changes
	Date	Name	Date	Name	
01	16.03.2012	Nitsche	17.03.2012	Sebold	First release
02	27.10.2014	Nitsche	28.10.2014	Sebold	CANopen, SNMP added
03	17.01.2017	Nitsche	18.01.2017	Sebold	Details on ports, technical information in accordance to R6.x added
04	23.10.2018	Scholtz	24.10.2018	Leuthe	3 Network Requirements adapted, 3.2 Ports and Protocols adapted and added
05	16.03.2020	Nitsche	17.03.2020	Wiehl	3.2 Ports and Protocols adapted and added

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