Supplementary Installation and Operating Instructions

Optiflux IFC300 Converter with HART Interface

- HART/Field Communicator 275/375
- Asset Management Solutions (AMS)
- Process Device Manager (PDM)
- Field Device Tool/Device Type Manager (FDT/DTM)
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1 General Information

The IFC 300 is a “four-wire” transmitter with 4...20mA current output and HART® capability. Dependent on jumper setting and wiring the current output can operate as active or passive output.

General characteristics of the IFC 300 HART® interface:
- Multidrop Mode is supported
- Burst Mode is not supported

Electrical connection: Refer to section “Electrical connection: outputs and inputs” of the following manual:
- “Handbook IFC 300 signal converter” (KROHNE)

There are two ways of using the HART® communication:

a) As a point-to-point connection between the IFC 300 and the HART® master equipment. The instrument's current output may be active or passive.
b) As a multipoint connection (multidrop) with up to 15 devices (IFC 300 or other HART® equipment) in parallel. The instrument's current outputs must be passive.
In case that the IFC 300’s current output shall work continuously active a ‘third wire’ is needed to properly connect it together with two-wire loop powered devices in the same network.

**Multidrop Mode (‘three-wire’)**

(Connecting two-wire and four-wire devices in the same network)

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### 2 IDs and Revision numbers

The HART Device Descriptions described in this document have the following IDs and revision numbers:

- **Manufacturer ID:** 69 (0x45)
- **Device Type:** 227 (0xE3)
- **Device Revision:** 1
- **DD Revision:** 2
- **HART Universal Revision:** 5
- **HC 275 OS Revision:** $\geq 4.9$
- **FC 375 System SW Rev.:** $\geq 1.8$
- **AMS Version:** $\geq 6.0$
- **PDM Version:** $\geq 5.2$
- **FDT Version:** $\geq 1.2$

For information about Transmitter Revisions and related Device Descriptions refer to the KROHNE HART Device List.
3 HART Communicator 275 (HC275), Field Communicator 375 (FC375)

3.1 Installation
The IFC 300 HART Device Description has to be installed on the HC275 and FC375 respectively. Otherwise the user will work with the instrument as a generic one thus loosing opportunity for entire instrument control.
For installing DDs on the HC275 a ‘HART Communicator Module Programmer’ is needed (see details in the ‘Module Programmer User's Guide’).
For installing DDs on the FC375 the ‘Easy Upgrade Programming Utility’ is needed and the FC375 must have a System Card with ‘Easy Upgrade’ option (see details in the ‘375 Field Communicator User’s Manual’).

3.2 Operating
Refer to the IFC 300 Menu Tree HC275 / FC375 (Attachment A).
The IFC 300 operation via HC275 / FC375 is made quite close to the manual instrument control via keypad with the restriction that parameters of the device's "service" menu are not supported and simulation is possible only for current outputs. The online help of each parameter contains its function number as a reference to the device’s local display and the “Handbook”.
Parameter protection for custody transfer is the same as on the device's local display. Other specific protection mechanisms like "password quick setup" and "password setup" are not supported via HART.
The set of parameters of the HC275 "standard configuration" is only a partial set. However the HC275 “full configuration" contains a complete set of supported parameters. Both types of configurations can be transferred to AMS.
The FC375 always creates a "full" configuration for interaction with AMS. Still the FC375 considers only a partial parameter set (like the HC275 "standard configuration") when sending it to a device.

4 Asset Management Solutions (AMS)

4.1 Installation
If the IFC 300 Device Description is not already installed on the AMS System a so called Installation Kit IFC 300 HART AMS is needed (available as download from KROHNE ‘Download Centre’ on the internet or on floppy disk / CD-ROM from KROHNE).
For installing the DD with the Installation Kit refer to the “AMS Intelligent Device Manager Books Online” section “Basic AMS Functionality /Device Configurations / Installing Device Types / Procedures /Install device types from media”. Please read also the “readme.txt”, which is also contained in the Installation Kit.

4.2 Operating
Refer to the IFC 300 Menu Tree AMS (Attachment B).
Due to AMS requirements and conventions the IFC 300 operation differs to some extent from operation with HC275 / FC375 and via local keypad. Furthermore parameters of the device's "service" menu are not supported and simulation is possible only for current outputs. The online help of each parameter contains its function number as a reference to the device’s local display and the “Handbook”.
Parameter protection for custody transfer is the same as on the device's local display. Other specific protection mechanisms like "password quick setup" and "password setup" are not supported via HART.
5  Process Device Manager (PDM)

5.1  Installation
If the IFC 300 Device Description is not already installed on the PDM System a so called Device Install IFC 300 HART PDM is needed (available as download from KROHNE ‘Download Centre’ on the internet or on floppy disk / CD-ROM from KROHNE).
For installing the DD on PDM V 5.2 refer to the “PDM Manual” section 11.2: "Device Install / Integrating Devices in SIMATIC PDM with ‘Device Install’".
For installing the DD on PDM V 6.0 refer to the “PDM Manual” section 13: "Integrating Devices".
Please read also the “readme.txt”, which is also contained in the Device Install.

5.2  Operating
Refer to the IFC 300 Menu Tree PDM (Attachment C).
Due to PDM requirements and conventions the IFC 300 operation differs to some extent from operation with HC275 / FC375 and via local keypad. Furthermore parameters of the device’s "service" menu are not supported and simulation is possible only for current outputs. The online help of each parameter contains its function number as a reference to the device’s local display and the "Handbook".
Parameter protection for custody transfer is the same as on the device's local display. Other specific protection mechanisms like "password quick setup" and "password setup" are not supported via HART.

6  Field Device Tool Device Type Manager (FDT DTM)

6.1  Installation
If the IFC 300 Device Type Manager is not already installed on the Field Device Tool container a setup is needed (available as download from KROHNE ‘Download Centre’ on the internet or on CD-ROM from KROHNE).
For installing the DTM with the setup refer to the setup’s accompanying documentation.

6.2  Operating
The IFC 300 operation via DTM is made quite close to the manual instrument control via keypad. Refer to the device’s local display and the "Handbook".
Supplementary Installation and Operating Instructions IFC 300 HART
HC275, FC375, AMS, PDM, FDT DTM

IFC 300 HART Menu Tree HC275 / FC375

1 dynamic variables
2 quick setup
3 test
4 setup

1 process input

1 hardware
2 A
3 B
4 C
5 D

1 terminals A Cust
2 terminals B Cust
3 terminals C Cust
4 terminals D Cust

current output Opt :
1 range 0% Cust
2 range 100% Cust
3 ext. range min Cust
4 ext. range max Cust
5 error current Cust
6 error condition Cust
7 measurement Cust
8 range min Cust
9 range max Cust
10 polarity Cust
11 limit min Cust
12 limit max Cust
13 lfc threshold Cust
14 lfc hysteresis Cust
15 time constant Cust
16 special function Cust
17 rc threshold Opt, Cust
18 rc hysteresis Opt, Cust

frequency output Opt :
1 pulse shape Cust
2 pulse width Cust
3 100% pulse rate Cust
4 measurement Cust
5 range min Cust
6 range max Cust
7 polarity Cust
8 limit min Cust
9 limit max Cust
10 lfc threshold Cust
11 lfc hysteresis Cust
12 time constant Cust
13 invert signal Cust
14 special function Opt, Cust
15 phase shift w. B Opt, Cust

pulse output Opt :
1 pulse shape Cust
2 pulse width Cust
3 max pulse rate Cust
4 measurement Cust
5 pulse value unit Cust
6 value p. pulse Cust
7 polarity Cust
8 lfc threshold Cust
9 lfc hysteresis Cust
10 time constant
11 invert signal Cust
12 special function Opt, Cust
13 phase shift w. B Opt, Cust

status output Opt :
1 mode
2 output A Opt
3 output B Opt
4 output C Opt
5 output D Opt
6 invert signal

limit switch Opt :
1 measurement
2 threshold
3 hysteresis
4 polarity
5 time constant
6 invert signal

control input Opt :
1 mode Cust
2 invert signal

Designations:
Opt Optional, dependent on device implementation / configuration
Read-only
Cust Custody Lock protected
Loc Local HC275/FC375, affects only HC275/FC375 views

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Designations:
Opt Optional, dependent on device implementation / configuration
Loc Read-only
Cust Custody Lock protected
Loc Local HC275/FC375, affects only HC275/FC375 views
IFC 300 HART Menu Tree AMS

**Quick Setup**
- Device:
  - Language
  - Tag
- Pulse output D:
  - Pulse value unit
  - Value p. pulse D
- Current output A/C:
  - Unit A/C
  - Range A/C max
  - Range A/C min
  - Time constant A/C
  - IFC threshold A/C
  - IFC hysteresis A/C

**Input Calibration**
- Target conductivity
- E.F. electrode factor
- Num. of electrodes
- Field frequency
- Select settling
- Setting time
- Line frequency

**Input Filter**
- Limitation max
- Limitation min
- Flow direction
- Time constant
- Pulse filter
- Pulse width
- Pulse limitation
- Noise filter
- Noise level
- Noise suppression
- IFC threshold
- IFC hysteresis

**Self Test / Info**
- Self test:
  - Empty pipe
  - Limit empty pipe
  - Limit full pipe
  - Linearity
  - Gain
  - Coil current
- Self test:
  - Flow profile
  - Limit flow profile
  - Limit elect. noise
  - Setting of field
  - Information:
  - Liner
  - Electrode material

**Designations:**
- Opt: Optional, dependent on device implementation / configuration
- Rd: Read-only
- Cust: Custody Lock protected
- Loc: Local AMS, affects only AMS views
Supplementary Installation and Operating Instructions IFC 300 HART
HC275, FC375, AMS, PDM, FDT DTM

IFC 300 HART Menu Tree AMS

Configure
Compare
Clear Offline

Status/Conditions
Process Variables
Scan Device

Calibration Management
Diagnostics and Test
Calibrate
Reset

Rename
Unassign
Assign / Replace

Audit Trail
Record Manual Event
Drawings / Notes ...
Help ...

I/O terminals A/B/C/D
• terminals
  current output Opt:
    • measurement Cust
    • limitation max Cust
    • limitation min Cust
    • time constant Cust
    • polarity Cust
    • lfc threshold Cust
    • lfc hysteresis Cust
    • range max Cust
    • range min Cust
  • range 100% Cust
  • range 0% Cust
  • ext. range max Cust
  • ext. range min Cust
  • error current Cust
  • error condition Cust
  • special function Cust
  • re threshold Opt, Cust
  • re hysteresis Opt, Cust

frequency output Opt:
  • measurement Cust
  • limitation max Cust
  • limitation min Cust
  • time constant Cust
  • polarity Cust
  • lfc threshold Cust
  • lfc hysteresis Cust
  • range max Cust
  • range min Cust
  • pulse shape Cust
  • pulse width Cust
  • 100% pulse rate Cust
  • invert signal Cust
  • special function Opt, Cust
  • phase shift wrt. B Opt, Cust

pulse output Opt:
  • measurement Cust
  • time constant Cust
  • polarity Cust
  • lfc threshold Cust
  • lfc hysteresis Cust
  • pulse value unit Cust
  • value p. pulse Cust
  • pulse shape Cust
  • pulse width Cust
  • max pulse rate Cust
  • invert signal Opt, Cust
  • special function Opt, Cust
  • phase shift wrt. B Opt, Cust

status output Opt:
  • mode
  • output A Opt
  • output B Opt
  • output C Opt
  • output D Opt
  • invert signal

limit switch Opt:
  • measurement
  • time constant
  • polarity
  • threshold
  • hysteresis
  • invert signal

control input Opt:
  • mode Cust
  • invert signal

counter

Designations:
Opt Optional, dependent on device implementation / configuration
Rd Read-only
Cust Custody Lock protected
Loc Local AMS, affects only AMS views

KROHNE Messtechnik GmbH & Co. KG · Ludwig-Krohne-Str. 5 · D-47058 Duisburg
Tel.: 0203-301 0 · Fax: 0203-301 389 · e-mail: krohne@krohne.de
### IFC 300 HART Menu Tree AMS

#### device
- **device info:**
  - tag
  - C number
- **display:**
  - language
  - default display

#### 1./2. meas page
- **function**
- **measurem. 1. line**
- **limitation max**
- **limitation min**
- **time constant**
- **lfc threshold**
- **lfc hysteresis**
- **range max**
- **range min**
- **format 1. line**

#### HART
- **identification:**
  - manufacturer
  - model
  - device ID
- **address**
- **tag**
- **date**
- **message**
- **descriptor**
- **write protect**
- **final assembly no.**
- **sensor serial no.**

- **revision numbers:**
  - universal rev.
  - device rev.
  - software rev.
  - hardware rev.

- **dynamic variables settings:**
  - request preambles
  - response preambles

- **display formats:**
  - volume flow
  - mass flow
  - flow speed
  - conductivity
  - temperature
  - counter 1
  - counter 2

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**Designations:**
- Opt: Optional, dependent on device implementation / configuration
- Rd: Read-only
- Cust: Custody Lock protected
- Loc: Local AMS, affects only AMS views

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IFC 300 HART Menu Tree AMS

Overview

Standard:
- Primary variable out of limits
- Non-primary variable out of limits
- Primary variable analog output saturated
- Primary variable analog output fixed
- Cold start
- Configuration changed
- Field device malfunction

Failure in device

- error in device
- IO1 parameter
- IO2 configuration
- display
- sensor electronic
- sensor global
- sensor local
- field current local
- current output A
- current output B
- current output C
- software user interface
- hardware settings
- hardware detection
- RAM/ROM error IO 1
- RAM/ROM error IO 2

Application error

- application error
- empty pipe
- flow rate too high
- field frequency too high
- DC offset
- open circuit A
- open circuit B
- open circuit C
- over range A (current)
- over range B (current)
- over range C (current)
- over range A (pulse)
- over range B (pulse)
- over range D (pulse)
- active settings
- factory settings
- backup 1 settings
- backup 2 settings

Uncertain

- uncertain measurement
- pipe not full
- empty pipe
- linearity
- flow profile
- electrode noise
- gain error
- electrode symmetry
- field coil broken
- field coil bridged
- field current deviation
- field frequency too high
- electronic temperature
- coil temperature
- overflow counter 1
- overflow counter 2
- backplane invalid

Check req. & Information

check request:
- checks in progress
- test sensor

information:
- counter 1 stopped
- counter 2 stopped
- power fail
- control input A active
- control input B active
- over range display 1
- over range display 2
- backplane sensor
- backplane settings
- backplane difference
- optical interface

Designations:
- O: Optional, dependent on device implementation / configuration
- R: Read-only
- C: Custody Lock protected
- L: Local AMS, affects only AMS views
## Supplementary Installation and Operating Instructions IFC 300 HART

### HC275, FC375, AMS, PDM, FDT DTM

### IFC 300 HART Menu Tree AMS

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<th>Clear Offline</th>
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<th>Assign / Replace</th>
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<th>Record Manual Event</th>
<th>Drawings / Notes</th>
<th>Help</th>
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</tbody>
</table>

### Process Values:
- Volume flow
- Mass flow
- Flow speed
- Conductivity
- Coil temperature

### Counter:
- Counter 1
- Counter 2

### Outputs:
- A
- % range A
- B
- % range B
- C
- % range C
- D
- % range D

### Device:
- Tag
- Descriptor

### HART:
- Polling Address
- Device ID

### Simulation:
- Current output A/C
- Current/frequency output A
- Current/frequency output B
- Current/frequency output D
- Circuit Board Info

### Automation:
- Zero calibration
- D/A trim
- Apply values

### Circuit Board Info:
- Autom. zero calibration
- D/A trim
- Apply values

### Designations:
- Opt: Optional, dependent on device implementation / configuration
- Rd: Read-only
- Cust: Custody Lock protected
- Loc: Local AMS, affects only AMS views

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Supplementary Installation and Operating Instructions IFC 300 HART
HC275, FC375, AMS, PDM, FDT DTM
Attachment C

IFC 300 HART Menu Tree PDM
Menu Bar

- Communication Path
- Load To Device
- Load To PG/PC
- Set Address

- Test
  - Simulation current/frequency A (Opt, Cust)
  - Simulation current/frequency B (Opt, Cust)
  - Simulation current C (Opt, Cust)
  - Simulation frequency D (Opt, Cust)

- Reset
  - <master reset>
  - <reset errors>
  - <reset configuration changed flag>

- Calibration
  - Automatic zero calibration (Cust)
  - D/A trim (Cust)
  - Apply values (Cust)

- Parameter Protection

- HART
  - Dynamic variables settings
    - PV is (Ad)
    - SV is
    - TV is
    - 4V is
  - Request preambles (Ad)
  - Response preambles

Designations:
- Opt: Optional, dependent on device implementation / configuration
- Rd: Read-only
- Cust: Custody Lock protected
- Loc: Local PDM, affects only PDM views
Supplementary Installation and Operating Instructions IFC 300 HART
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IFC 300 HART Menu Tree PDM
Menu Bar

File  Device  View  Options  Help

Display

Measured Values
- volume flow
- mass flow
- flow speed
- conductivity
- coil temperature
- device status

Counters
- counter 1
- counter 2

Yt Diagram

- volume flow
- mass flow

Outputs

Current/frequency o. A
- measured value
- A
- % range A

Current/frequency o. B
- measured value
- B
- % range B

Current/frequency o. C
- measured value
- C
- % range C

Current/frequency o. D
- measured value
- D
- % range D

Device Status

Circuit Board Info

---

ToolBar
Status Bar

Update

Designations:
- Optional, dependent on device implementation / configuration
- Read-only
- Custody Lock protected
- Local PDM, affects only PDM views

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06.05
IFC 300 HART Menu Tree PDM
Parameter Table

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<th>Operation Unit</th>
<th>Device</th>
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<td></td>
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Designations:

*Opt* Optional, dependent on device

*Impl* Implementation / configuration

*Rd* Read-only

*Cust* Custody Lock protected

*Loc* Local PDM, affects only PDM views
### IFC 300 HART Menu Tree PDM

#### Parameter Table

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<td>• terminals A Cur</td>
<td>• terminals B Cur</td>
<td>• terminals C Cur</td>
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<td>• terminals D Cur</td>
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<thead>
<tr>
<th>A/B/C/D</th>
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<tbody>
<tr>
<td>• current output Opt</td>
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<tr>
<td>• range 0% Cur</td>
<td>• range 100% Cur</td>
<td>• ext. range min Cur</td>
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<tr>
<td>• ext. range max Cur</td>
<td>• error current Cur</td>
<td>• error condition Cur</td>
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<tr>
<td>• measurement Cur</td>
<td>• range min Cur</td>
<td>• range max Cur</td>
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<tr>
<td>• polarity Cur</td>
<td>• limit min Cur</td>
<td>• limit max Cur</td>
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<tr>
<td>• ifc threshold Cur</td>
<td>• ifc hysterisis Cur</td>
<td>• time constant Cur</td>
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<tr>
<td>• special function Cur</td>
<td>• rc threshold Opt, Cur</td>
<td>• rc hysterisis Opt, Cur</td>
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<tr>
<th>Frequency output Opt</th>
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<tbody>
<tr>
<td>• pulse shape Cur</td>
<td>• pulse width Cur</td>
<td>• 100% pulse rate Cur</td>
</tr>
<tr>
<td>• measurement Cur</td>
<td>• range min Cur</td>
<td>• range max Cur</td>
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<tr>
<td>• polarity Cur</td>
<td>• limit min Cur</td>
<td>• limit max Cur</td>
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<td>• ifc threshold Cur</td>
<td>• ifc hysterisis Cur</td>
<td>• time constant Cur</td>
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<tr>
<td>• invert signal Cur</td>
<td>• special function Opt, Cur</td>
<td>• phase shift wrt. B Opt, Cur</td>
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<th>Pulse output Opt</th>
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<tr>
<td>• pulse shape Cur</td>
<td>• pulse width Cur</td>
<td>• max pulse rate Cur</td>
</tr>
<tr>
<td>• measurement Cur</td>
<td>• pulse value unit Cur</td>
<td>• value p. pulse Cur</td>
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<tr>
<td>• polarity Cur</td>
<td>• ifc threshold Cur</td>
<td>• ifc hysterisis Cur</td>
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<tr>
<td>• time constant Cur</td>
<td>• invert signal Cur</td>
<td>• special function Opt, Cur</td>
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<tr>
<td>• phase shift wrt. B Opt, Cur</td>
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#### Status output Opt:
- • mode
- • invert signal

#### Limit switch Opt:
- • measurement
- • threshold
- • hysteresis
- • polarity
- • time constant
- • invert signal

#### Control input Opt:
- • mode Cust
- • invert signal

#### Human Interface:
- Local display
  - • language
  - • default display Cust
- Units (device)
  - • volume flow Cur
  - • mass flow Cur
  - • flow speed Cur
  - • conductivity Cur
  - • temperature Cur
  - • volume Cur
  - • mass Cur
  - • density Cur
- Units (HART)
  - • volume flow
  - • mass flow
  - • flow speed
  - • conductivity
  - • temperature
  - • counter 1
  - • counter 2
- Formats (HART)
  - • volume flow Loc
  - • mass flow Loc
  - • flow speed Loc
  - • conductivity Loc
  - • temperature Loc
  - • counter 1 Loc
  - • counter 2 Loc

Designations:
- Opt: Optional, dependent on device implementation / configuration
- Rd: Read-only
- Cust: Custody Lock protected
- Loc: Local PDM, affects only PDM views

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