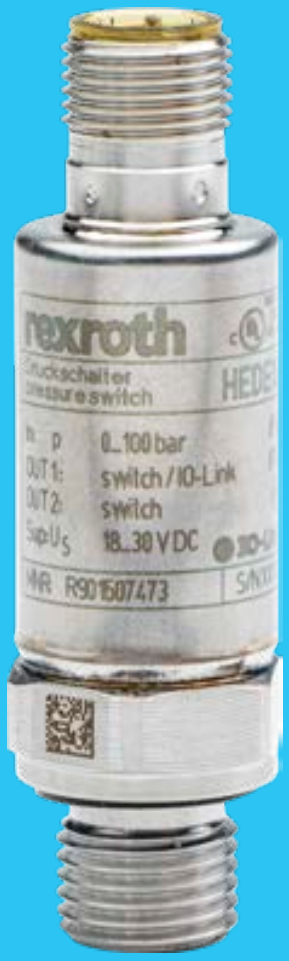
rexroth
A Bosch Company

Operating instructions

Electronic pressure switch for hydraulic applications

Type HEDE12-1X



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IO-Link

RE 30340-B Edition: 2022-11

Inhalt

The data specified only serve to describe the product. If information on the use of the product is given, it is only to be regarded as application examples and recommendations.
Catalog specifications do not constitute assured characteristics. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The cover shows an example configuration. The product delivered may differ from the image on the cover.

Translation of the original operating instructions. The original operating instructions were prepared in German language.

1 About this documentation

1.1 VALIDITY OF THE DOCUMENTATION

This documentation is valid for all HEDE12-1X products.

This documentation is intended for fitters, operators, service technicians, system operators and plant/machine manufacturers and contains important information on the safe and appropriate installation and commissioning of the product.

- ▶ Read this documentation completely and thoroughly before working with the pressure switch.

1.2 REQUIRED AND SUPPLEMENTARY DOCUMENTATION

- The product must not be commissioned until you have been provided with the following documentation and you have understood and observed it.

Table 1: Required and supplementary documentation

Title	Document no.	Document type
Electronic pressure switch for hydraulic applications Type HEDE12-1X	RE 30340	Data sheet
Electronic pressure switch for hydraulic applications Type HEDE12-1X	RE 30340-PA	Parameter description

1.3 REPRESENTATION OF INFORMATION

In order that this documentation allows you to work directly and safely with your product, standardized safety notes, symbols, terms, and abbreviations are used. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are provided whenever there is a risk of personal injury or damage to equipment. Observe the hazard avoidance measures described.Safety instructions are structured as follows:

⚠ *SIGNAL WORD*

Type and source of danger!

Consequences in case of non-compliance

- ▶ Hazard avoidance measures
- ▶ <Enumeration>

- **Warning symbol:** Draws attention to a hazard
- **Signal word:** Identifies the degree of hazard
- **Type and source of danger:** Specifies the type and source of hazard
- **Consequences:** Describes the consequences in case of non-observance
- **Precaution:** Specifies how the hazardous situation can be prevented

Table 2: Hazard classifications according to ANSI Z535.6-2011

Warning sign, signal word	Meaning
⚠ **DANGER**	Indicates a hazardous situation which, if not avoided, will certainly result in death or serious injury.
⚠ **WARNING**	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Damage to property: The product or the environment could be damaged.

1.3.2 Symbols

The following symbols indicate notices which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is disregarded, the product cannot be used or operated in an optimum manner.
▶	Individual, independent action
1.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
IODD	IO Device Description
UMRL	Upper Measuring Range Limit
PELV	Protective Extra Low Voltage
SELV	Safety Extra Low Voltage

2 Safety instructions

2.1 ABOUT THIS CHAPTER

The product has been manufactured according to the generally accepted codes of practice. However, there is still a risk of personal injury and damage to property if you do not observe the safety instructions in this documentation.

- ▶ Read this documentation completely and thoroughly before working with the product.
- ▶ Keep this documentation in a location where it is accessible to all users at all times.
- ▶ Always include the required documentation when passing the product on to third parties.

2.2 INTENDED USE

The product is an electronic component. These pressure switches comply with the Pressure Equipment Directive and are designed and manufactured for group 2 fluids in accordance with sound engineering practice. You may use the product as follows:

- For acquiring the system pressure in hydraulic systems.
- While adhering to the operating and ambient conditions and specified performance limits according to the data sheet.
- In the original condition, without damage
- Only in applications for which it is suitable without any restrictions
- Only in conjunction with media to which the wetted materials are sufficiently resistant

The product is intended exclusively for professional use and not for private usage.

2.3 IMPROPER USE

Any use other than described in the section “Intended use” is considered as improper and is therefore not permitted. Improper use of the pressure switch includes:

- Use in potentially explosive atmospheres.
- Use in safety-related applications
- Improper storing, improper handling, incorrect installation, insufficient cleanliness for storing and installation.
- Outside the operating limits according to data sheet RE 30340.

Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes all risks involved with improper use.

2.4 QUALIFICATION OF PERSONNEL

The activities described in this documentation require basic knowledge of mechanics and electrics. In order to ensure safe use, these activities may only be carried out by an expert in the respective field or an instructed person under the direction and supervision of an expert.

2.5 GENERAL SAFETY INSTRUCTIONS

- Observe the valid regulations on accident prevention and environmental protection.
- Observe the safety regulations and provisions of the country in which the product is used/applied.
- Only use Rexroth products in technically perfect condition.
- Observe all information on the product.

- Persons assembling, operating, disassembling or maintaining Rexroth products may not be under the influence of alcohol, other drugs or medication influencing the ability to react.
- Only use genuine Rexroth accessories and spare parts in order to exclude any hazard to persons due to unsuitable spare parts.
- Comply with the technical data and ambient conditions specified in the product documentation.
- Before commissioning the pressure switch, read this document and make sure that the product is suitable for your application without any restrictions.
- Notes on pressure limits, product materials and materials in contact with the media as well as further information can be found in the technical data (see data sheet).

2.6 PRODUCT-SPECIFIC SAFETY INSTRUCTIONS

⚠ WARNING

System parts under pressure and ejecting hydraulic fluid!

In hydraulic systems with stored energy (accumulator or cylinder operating under gravity) hydraulic components may still be under pressure even after the pressure supply was switched off. During installation and demounting, the pressure switch or parts may be hurled around and cause personal injuries and/or damage to property. There is moreover the risk of serious injury caused by a powerful, ejecting hydraulic fluid jet.
Before working on the hydraulic product depressurize the hydraulic system and de-energize the electrical control.

⚠ WARNING

Faulty fastening!

The pressure switch may loosen and fall down. Consequently, hydraulic fluid may leak and lead to personal injuries and/or damage to property.

- ▶ Install the pressure switch thoroughly according to the mounting instructions by means of suitable mounting aids.
- ▶ Adhere to the specified tightening torques.

Easily inflammable hydraulic fluid!

In connection with fire or other sources of heat, leaking hydraulic fluid mist, which results from defective or incompletely mounted pressure switches and their connections, may lead to fire or explosions.

- ▶ Do not use hydraulic components in areas with open fire and only at a sufficient distance to sources of heat.

⚠ CAUTION

High surface temperatures!

Risk of burning! During operation, surface temperatures may exceed permissible temperatures according to DIN EN 563.

- ▶ Let the pressure switch cool down before touching it or wear protective gloves.
- ▶ Protect the housing against contact with flammable substances and against accidental touching.

2.7 OBLIGATIONS OF THE MACHINE END-USER

The operation of installations, systems and machines basically requires the implementation of a holistic IT security concept which is state-of-the-art in terms of technology. Accordingly, Bosch Rexroth products and their properties have to be considered as components of installations, systems and machines for their holistic IT security concept.

Unless otherwise documented, Bosch Rexroth products are designed for operation in local, physically and logically secured networks with access restrictions for authorized persons, and they are not classified according to IEC 62443-4-2.

3 General notes on damage to property and damage to the product

The warranty only applies to the delivered configuration.

- The claim to warranty expires if the product is assembled, commissioned and operated incorrectly, not used as intended and/or handled improperly.

NOTICE

Impermissible mechanical loading!

Impact or similar forces on the pressure switch may damage or even destroy it.

▶ Never use pressure switches as a handle or step.

NOTICE

Environmentally harmful hydraulic fluid!

Leaking hydraulic fluid leads to environmental pollution.

- ▶ Remove any leakage immediately.
- ▶ Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country.

Dirt and foreign particles in hydraulic components!

Penetrating dirt and foreign particles lead to wear and malfunctions. Safe functioning of the hydraulic components is no longer ensured.

- ▶ During installation, ensure utmost cleanliness in order to prevent foreign particles such as welding beads or metal chips from getting into the hydraulic lines.
- ▶ Do not use linty cloth for cleaning.
- ▶ Ensure that no cleaning agents are able to penetrate the hydraulic system.

Contaminated hydraulic fluid!

Contamination in the hydraulic fluid can lead to malfunction, e.g. jamming or clogging of the pressure switch.

- ▶ Ensure sufficient cleanliness of the hydraulic fluid over the entire operating range.

4 Scope of delivery

1 x pressure switch, 1 x documentation in German and English

5 About this product

The device senses the hydraulic pressure and issues pressure-related switching signals and data at the output.

5.1 OPERATING RANGE

WARNING

Overpressure!

Risk of injury and risk of destruction of the pressure switch, even if the bursting pressure is exceeded only briefly.

- ▶ Avoid static and dynamic overpressure exceeding the specified pressure resistance.

Table 5: Operating range HEDE12-1X - pressure type: Relative pressure

Types:	Measuring range		Overload pressure		Burst pressure	
HEDE12...	bar	psi	bar	psi	bar	psi
-1x/100-...	0...100	0...1450.5	200	2900	400	5802
-1x/250-...	0...250	0...3626	500	7250	1000	14500
-1x/400-...	0...400	0...5802	800	11600	1600	23205
-1x/630-...	0...630	0...9137	1000	14504	2520	36550

MPa = bar ÷ 10 / kPa = bar × 100

The units are vacuum-resistant.

Restrictor in process connection:
In hydraulic systems, highly dynamic effects such as pressure peaks, cavitation, etc. may occur depending on the relevant operating state. To reduce these effects on the measuring element of the sensor, a restrictor element is integrated in the process connection. The specifically designed thread pitch at the restrictor element has the effect of a 0.3 mm bore.

High viscosities can delay the response by some milliseconds. Severe soiling may impair the function.

5.2 FUNCTION

The device generates output signals according to the operating mode and the parameter setting. It moreover provides the process data, switching states and diagnostic messages via IO-Link.

5.3 COMMUNICATION, PARAMETERIZATION, EVALUATION

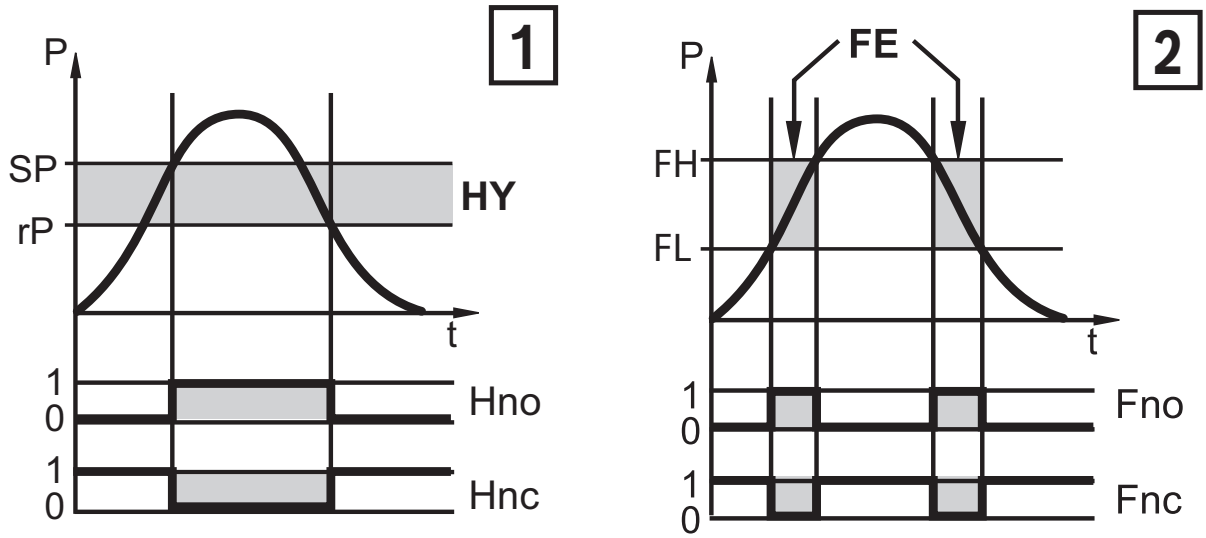
OUT1 (pin 4)	Switching signal for system pressure limit value Communication via IO-Link
OUT2 (pin 2)	Switching signal for system pressure limit value

5.3.1 Switching function

OUTx changes its switching state if it is above or below the set switching limits (SPx, rPx). The following switching functions can be selected:

- Hysteresis function / normally open: [**ou1**] / [**ou2**] = [**Hno**] (see Fig. 1).
- Hysteresis function / normally closed: [**ou1**] / [**ou2**] = [**Hnc**] (see Fig. 1).

- First the set point (SPx) is to be determined, then the reset point (rPx). The hysteresis thus defined remains, even if SPx is changed again.
- Window function / normally open: [**ou1**] / [**ou2**] = [**Fno**] (see Fig. 2).
- Window function / normally closed: [**ou1**] / [**ou2**] = [**Fnc**] (see Fig. 2).
- The width of the window can be set by means of the difference between FHx and Flx. FHx = upper value, FLx = lower value.



P = system pressure, **HY** = hysteresis, **FE** = window

When set to the window function, the set and reset points have a fixed hysteresis of 0.25 % of the measuring span.

5.3.2 IO-Link

The pressure switch is provided with an IO-Link communication interface, which requires an IO-Link-capable module (IO-Link master) for operation. The IO-Link interface enables direct access to the process and diagnostic data and provides the possibility of setting parameters of the pressure switch during operation. In addition, communication is possible via a point-to-point connection with a USB adapter cable (see chapter “Parameterization”).

You can find the IODDs necessary for the configuration of the device, detailed information about process data structure, diagnostic information and parameter addresses as well as the required information on the necessary IO-Link hardware at
www.boschrexroth.com/hede12-1x

6 Installation

1. Before installing the pressure switch, make sure that the system is depressurized.
2. Check the process connection for compatibility.
3. Insert the pressure switch in a G¼ process connection.
4. Tighten firmly. Recommended tightening torque:

Upper measuring range limit value in bar	Tightening torque in Nm
up to 400 bar	25...35 Nm
630 bar	30...50 Nm
Dependent on lubrication, seal and pressure load!	

6.1 ELECTRICAL CONNECTION

⚠ CAUTION

Voltage!

Hazard caused by connection to supply outside SELV/PELV.

- ▶ The sensor may exclusively be installed by a qualified electrician.
- ▶ Observe national and international regulations for the erection of electrotechnical systems.
- ▶ Observe voltage supply according to EN 50178, SELV, PELV.

With regard to cULus:
The device shall be supplied from an isolating transformer having a secondary Listed fuse rated either

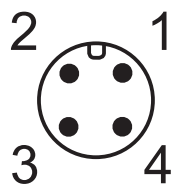
a) max 5 amps for voltages 0...20 Vrms (0...28.3 Vp) or

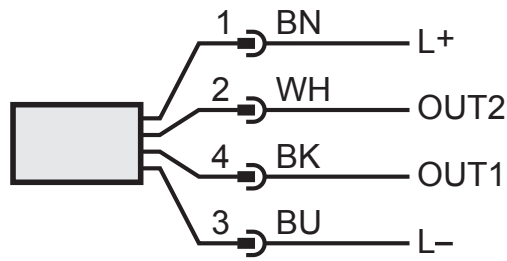
b) 100/Vp for voltages of 20...30 Vrms (28.3...42.4 Vp).

The device shall be connected only by using any Listed (CYJV/7) or R/C (CYJV2/8) cord in respect of Condition of Acceptability, having suitable ratings. (See ML File No. E223220).

1. Disconnect the system from the power supply.
2. Connect the sensor as follows:

Wire color	
BK	Black
BN	Brown
BU	Blue
WH	White



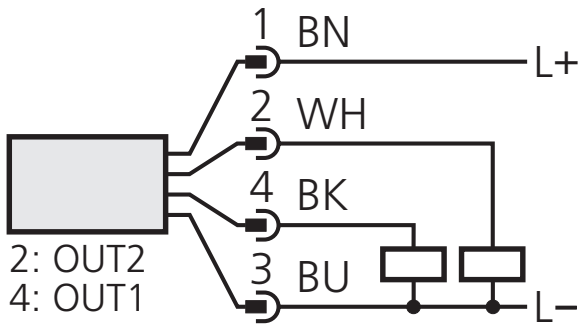


OUT1 Switching output or IO-Link
OUT2 Switching output

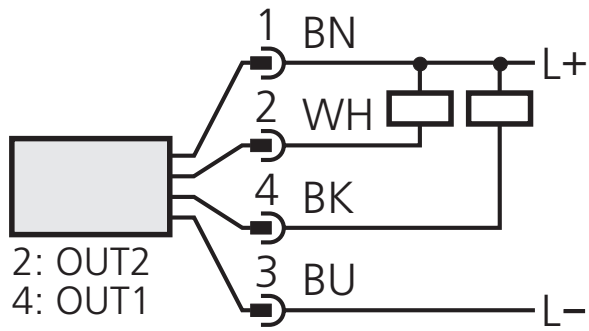
Color coding according to DIN EN 60947-5-2

Example circuits

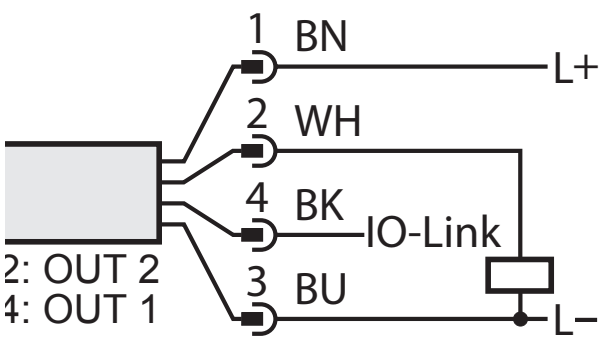
2 x positive switching



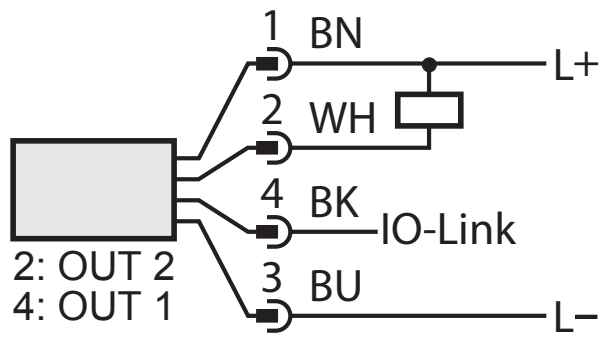
2 x negative switching



1 x p-switching, 1 x IO-Link



1 x n-switching, 1 x IO-Link



To ensure electromagnetic compatibility (surge resistance) the max. cable length for a non-shielded supply cable is 30 m. Beyond this length only shielded supply cables are permitted, and the cable shield has to be connected at both ends.

7 Parameterization

NOTICE

Changed operation of the system!

Changing parameters during operation can influence the operation of the system and cause damage.

- ▶ Make sure that no malfunction can occur in the system.

The device can only be parameterized by means of the IO-Link function.

1. Prepare the IO-Link hardware and software for parameter setting.
2. Connect the device e.g., with the IO-Link master.
3. Set the parameters.
4. Commission the device.

The parameters can be set before the device is installed and commissioned or during operation.

7.1 LIST OF PARAMETERS

Parameter	Function
SPx/rPx	Upper/lower limit value for system pressure, at which OUTx switches with hysteresis setting. Prerequisite: OUTx setting is [Hno] or [Hnc].
FHx/FLx	Upper/lower limit value for system pressure, at which OUTx switches with window setting. Prerequisite: OUTx setting is [Fno] or [Fnc]

Parameter	Function
ou1	Output function for OUT1: Switching signal for the pressure limit values: Hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].
ou2	Output function for OUT2: Switching signal for the pressure limit values: Hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].
dS1 / dS2	Set delay for OUT1 / OUT2
dr1 / dr2	Reset delay for OUT1 / OUT2
uni	Default unit for system pressure: [bAr] / [MPA] / [PSI]
P-n	Switching logic of outputs: pnp / npn.
Lo	Minimum value memory for system pressure.
Hi	Maximum value memory for system pressure.
dAP	Damping of the switching point
coF	Zero point calibration
HIPS	Configuration of overload counter threshold
HIPC	Number of overload events

7.2 CUSTOMIZED SWITCHING POINTS

At the customer's request the switching points can be set specifically in the factory. Further information can be found in the IODD description (see `www.boschrexroth.com/hede12-1x`) or the context-specific parameter descriptions.

8 Factory setting

	Factory setting	Custom setting
SP1	25 % of UMRL*	
rP1	23 % of UMRL*	
ou1	Hno	
ou2	Hno	
SP2	75 % of UMRL*	
rP2	73 % of UMRL*	
dS1	0.0 s	
dr1	0.0 s	
dS2	0.0 s	
dr2	0.0 s	
P-n	PnP	
dAP	0.06 s	
uni	bar	
coF	0: bar	
HIPS	UMRL	
HIPC	0	

* = The set value is the specified percentage of the upper measuring range limit value (UMRL) of the relevant sensor in bar.
NOTE: In the case of custom settings of the switching points these values deviate from the above factory setting!

9 Maintenance and repair

Rexroth pressure switches require no maintenance. Seals are subject to a natural process of wear and aging. It is therefore recommended that they are changed at reasonable intervals. The time intervals are mainly determined by the operating conditions and cleanliness of the hydraulic fluid.

9.1 REPAIR

Rexroth pressure switches may only be replaced as a complete unit.

10 Demounting and replacement

1. Disconnect your system from the power supply and depressurize it.
2. Unload hydraulic accumulators, if provided.
3. Make sure that the surroundings are clean for demounting.
4. Collect escaping hydraulic fluid in the provided container and dispose of it properly.
5. Loosen the pressure switch exclusively by means of a suitable tool.

11 Disposal

11.1 ENVIRONMENTAL PROTECTION

Careless disposal of the hydraulic components and the hydraulic fluid can lead to pollution of the environment.

- ▶ Dispose of the product in accordance with the currently applicable national provisions in your country.
- ▶ Dispose of hydraulic fluid residues according to the applicable safety data sheets for these hydraulic fluids.

12 Annex

12.1 LIST OF ADDRESSES

Contacts for transport damage, repair and spare parts

Bosch Rexroth AG
Service Industriehydraulik
Bürgermeister-Dr.-Nebel-Strasse 8
97816 Lohr am Main
Germany

Telephone	+49 (0) 9352/40 50 60
Email	service@boschrexroth.de

Ordering address for pressure switches

Headquarters:
Bosch Rexroth AG
Zum Eisengiesser 1
97816 Lohr am Main
Germany

Telephone	+49 (0) 9352/18-0
Email	info@boschrexroth.de

The addresses of our sales and service network and sales organizations can be found at `www.boschrexroth.com`

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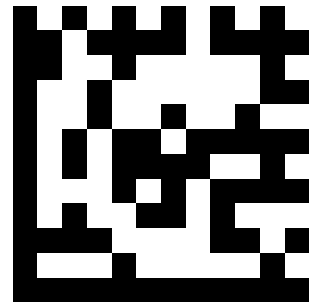

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