DIEHL
Metering

smart in solutions

HYDRUS

F06-006

PRODUCT SPECIFICATION

for the customer

Static ultrasonic water meter for accurate recording and reading of consumption in all areas of water supply.

Document version: 1.5

26.03.2018

Subject to technical changes

Save document | Print document | Send document | Reset document

Contents

1. Functional description

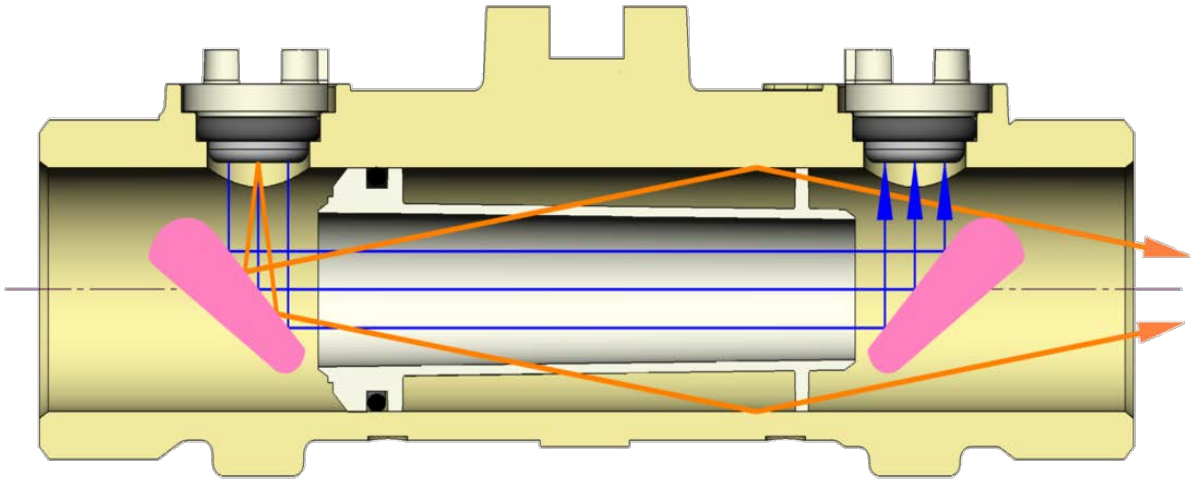
Application

HYDRUS is a static ultrasonic water meter for accurate recording and reading of consumption in all areas of water supply.
It is not affected by sediment and suspended solids in the water and so ensures stable long-term measuring accuracy even under difficult conditions.
With its innovative combination of ultrasonic technology and integrated communication, HYDRUS makes water consumption transparent – and is ideal as part of an automatic meter reading (AMR) system. Reading is possible in seconds using the radio protocol to the Open Metering standard or a wired M-Bus interface and real meter counts create the perfect database for smart metering. HYDRUS therefore provides the database for complex consumption profiles in real time if required.

Measuring principle

Ultrasonic measurement in HYDRUS is based on the echo time difference measuring procedure. The ultrasonic transducer in the meter sends an ultrasonic signal in the flow direction and against the flow direction. This ultrasonic signal is reflected by the reflector, passes through the measuring tube to the reflector opposite and sends the signal to the second ultrasonic transducer. During a flow of water the time needed by the signal in the flow direction is shorter than the time needed against flow direction. This measured "echo time difference" is directly proportional to the flow velocity and thus to the flow volume. This value together with the cross-section of the measuring tube can be used to calculate the flow volume. HYDRUS makes every two seconds an ultrasonic measurement.

The water temperature required to accurately determine the sound velocity and calculate flow effects is measured by a temperature sensor every four seconds.



Overview technical data

HYDRUS Overview technical data	
Electromagnetic environmental class	E1 and E2
Metrological class	OIML R 49 class 2
Ambient class	OIML R 49 class C
Calming sections (not necessary)	U0 / D0
Protection class	IP 68
Nominal pressure	PN 16
MID approval for medium temperature	T30, T50, T90
Medium temperature	0,1 ... 90 °C
Ambient temperature	1 ... 70 °C
Storage temperature	-20 ... +70 °C (>35 °C max. 4 weeks)
Volume calculation	every 2 seconds
Measurement water temperature	every 4 seconds
Updating of the display values	every 5 seconds
LCD display	8-digit
Communication interfaces	Optical, Radio 434 / 868 MHz, Radio 434 / 868 MHz - L-Bus, M-Bus, Pulse
Battery lifetime T30*/T50*	Up to 12 years (one battery), up to 16 years (two batteries)
Battery lifetime T90*	Up to 12 years (all interfaces)
Radio mode	T1 Mode (unidirectional)
OMS versions	OMS 3, Security Profile A oder OMS 4, Security Profile B (BSI security)
Sending interval OMS 3	aprox. every 12 seconds
Sending interval OMS 4	aprox. every 14 seconds
Data storage	Data logging capabilities to record up to 1.024 daily values + 32 configurable values (hourly, daily, weekly, monthly) and an annual due date

*The battery life depends on the sending interval of the radio telegram, the telegram length and the ambient temperature at the installation location

Volume calculation and pendulum hysteresis

HYDRUS is approved according to the MID for forward volume and can detect reverse volume. The calibrated total volume (value with lock symbol in the display) is composed of the difference between the forward volume and the reverse volume and is the accounting-relevant value.

In order to prevent a misinterpretation of forward- and reverse consumption in the case of low fluctuating water columns, the eletronic has a built-in pendulum hysteresis. The actual addition / substraction of volume consumption is as shown in the example below for a HYDRUS with Q_3 2.5 m³/h. This applies for forward- and also reverse volume. The pendulum hysteresis serves for the exact calculation of the billing-relevant consumption, the alarm mechanisms and the flow calculation are excluded.

The pendulum hysteresis depends on the Q_3 value of the meter:
Q_3 **2.5** m³/h: 2.5 Liter
Q_3 **4** m³/h: 4 Liter
Q_3 **6.3** m³/h: 6.3 Liter
Q_3 **10** m³/h: 10 Liter
Q_3 **16** m³/h: 16 Liter
Q_3 **25** m³/h: 25 Liter

Example for Q_3 2.5 m³/h -> Pendulum hysteresis 2.5 Liter						
Process	Volume consumption	Hyseresis storage	Difference - Volume consumption depending on the hysteresis storage	Total volume	Forward volume	Reverse volume
1	0 Liter	0 Liter	0 Liter	0 Liter	0 Liter	0 Liter
2	+ 10 Liter	0 Liter	10 Liter	10 Liter	10 Liter	0 Liter
3	- 5 Liter	- 2,5 Liter	2,5 Liter	7,5 Liter	10 Liter	2,5 Liter
4	- 3 Liter	- 2,5 Liter	- 3 Liter	4,5 Liter	10 Liter	5,5 Liter
5	+ 2 Liter	- 0,5 Liter	0 Liter	4,5 Liter	10 Liter	5,5 Liter
6	+ 1 Liter	0,5 Liter	0,5 Liter	5 Liter	10,5 Liter	5,5 Liter
				5 Liter as total volume at the end of the example processes		

Conditions

HYDRUS modes	Errors	Alarms	Radio	Measuring interval
Storage mode	on	off	off	1/60 Hz (1 minute)
↓ When water is detected ↑ When water is detected less than 3 hours				
Field mode	on	off	on	0,5 Hz (2 seconds)
↓ After detection of water for 3 hours without interruption				
Permanent Field mode	on	on	on	0,5 Hz (2 seconds)

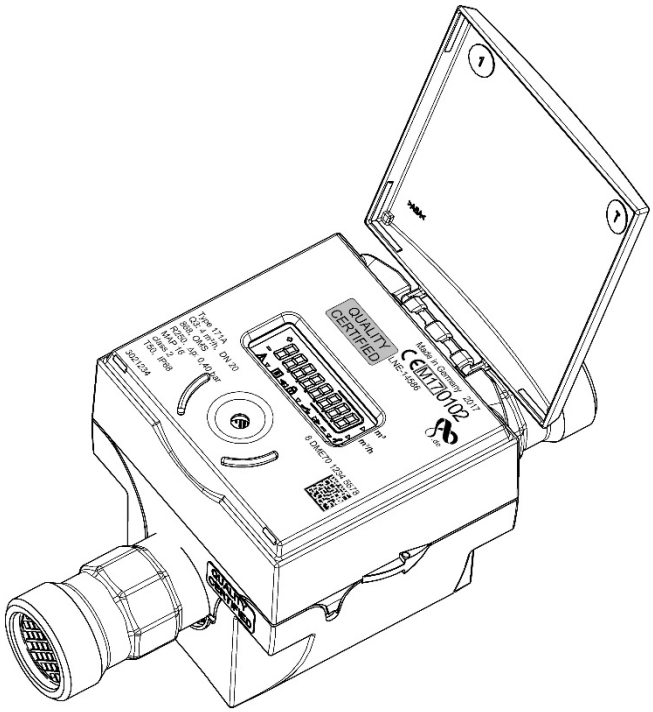
Contents

Mechanical design

HYDRUS consists of two main components – the hydraulic part and the encapsulated electronics.
The hydraulic part consists of a brass housing, ultrasonic transducer, temperature sensor and a plastic measuring insert with holders for the two reflectors. The ultrasonic transducers are connected to the printed circuit board by a cable and fixed to the brass housing by plastic shells.

The complete electronics module consists of printed circuit board, batteries, LCD and the connected cables. It is fully potted to provide optimum protection against condensation or moisture penetrating from outside. Due to fully potting of the electronic we reach a vacuum in the meter which displaces the air.

The electronics module is connected permanently to the hydraulic part of the meter and cannot be detached. HYDRUS is encased in a UV-resistant plastic housing with suitable plastic and adhesive seals to protect against unauthorized opening.



2. Approved meter data

APPROVAL

		DN 15 - 20
Approval		MID LNE 14586, OIML R49, EN 14154, TVO, KTW, ACS
Dynamic range (Q_3/Q_1) - Q_3 1.6 m³/h (T30 - T50)	R	160 / 200 / 250
Dynamic range (Q_3/Q_1) - Q_3 2.5 m³/h (T30 - T50)	R	160 / 200 / 250 / 315 / 400
Dynamic range (Q_3/Q_1) - Q_3 4 m³/h (T30 - T50)	R	160 / 200 / 250
Dynamic range (Q_3/Q_1) - Q_3 1.6 - 4 m³/h (T90)	R	160 / 200

APPROVAL

		DN 25 - 50
Approval		MID LNE 14586, OIML R49, EN 14154, TVO, KTW, ACS
Dynamic range (Q_3/Q_1) - Q_3 6.3 m³/h (T30 - T50)	R	40 / 80 / 160 / 200
Dynamic range (Q_3/Q_1) - Q_3 10 m³/h (T30 - T50)	R	40 / 80 / 160 / 200 / 250
Dynamic range (Q_3/Q_1) - Q_3 16 m³/h (T30 - T50)	R	40 / 80 / 160 / 200 / 250 / 315[1] / 400[1]
Dynamic range (Q_3/Q_1) - Q_3 25m³/h (T30 - T50)	R	40 / 80 / 160 / 200 / 250 / 315 / 400
Dynamic range (Q_3/Q_1) - Q_3 6.3 - 25 m³/h (T90)	R	40 / 80 / 160

[1] not for DN 50

LNE
Le progrès, une passion à partager

Organisme notifié n°0071
Notified body

cofrac
CERTIFICATION DE PRODUITS ET SERVICES

CERTIFICAT D'EXAMEN UE DE TYPE

EU TYPE EXAMINATION CERTIFICATE

N° LNE - 14586 rév. 14 du 18 septembre 2017

Modifie le certificat 14586-13

Délivré par *Issued by* : Laboratoire national de métrologie et d'essais

En application *In accordance with* : Directive 2014/32/UE, Module B

Directive 2014/32/EU, Module B

Fabricant *Manufacturer* : DIEHL METERING GMBH - Industriestrasse 13
GERMANY - 91522 - ANSBACH

Mandataire *Authorized representative* : - - - -

Concernant *In respect of* : Compteurs d'eau types 171 A et 171 B.

Water meters types 171 A and 171 B.

Caractéristiques *Characteristics* : Compteurs d'eau complets à ultrasons mesurant la difference de durée de propagation des signaux à ultrasons.

Ultrasonic complete water meters working with a measurement of the running time difference of ultrasonic signals.

Valable jusqu'au *Valid until* : 17 novembre 2018
November 17th, 2018

Les principales caractéristiques et conditions d'approbation figurent dans l'annexe ci-jointe qui fait partie intégrante du certificat et comprend 15 page(s). Tous les plans, schémas et notices sont déposés au Laboratoire national de métrologie et d'essais sous la référence de dossier P165965 -2.

The principal characteristics, approval conditions are set out in the appendix hereto, which forms part of the approval documents and consists of 15 page(s). All the plans, shematic diagrams and documentations are recorded by Laboratoire national de métrologie et d'essais under reference file P165965 -2.

Etabli le 18 septembre 2017
Issued on September 18th, 2017

Pour le Directeur Général
On behalf of the General Director

LNE
Thomas LOMMATZSCH
Responsable du Pôle Certification Instrumentation
Measuring Instruments Division Manager

Laboratoire national de métrologie et d'essais
Établissement public à caractère industriel et commercial • Siège social : 1, rue Gaston Boissier - 75724 Paris Cedex 15 • Tél. : 01 40 43 37 00
Fax : 01 40 43 37 37 • E-mail : info@lne.fr • Internet : www.lne.fr • Siret : 313 320 244 00012 • NAF : 743 B • TVA : FR 92 313 320 244
Barclays Paris Centrale IBAN : FR76 3058 8600 0149 7267 4010 170 BIC : BARCFRPP

DIEHL Metering

DMDE-CE 124/10

smart in solutions

<DE><BG><ES><CS><DA><ET><EL><EN><FR><HR><IT><LV><LT><HU><MT><NL><PL><PT><RO><SK><SL><FI><SV>

<DE>**EU-KONFORMITÄTSERKLÄRUNG** <BG>**ЕС ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ** <ES>**DECLARACIÓN UE DE CONFORMIDAD**
<CS>**EU PROHLÁŠENÍ O SHODĚ** <DA>**EU-OVERENSSTEMMELSESERKLÆRING** <ET>**ELi VASTAVUSDEKLARATSIOON**
<EL>**ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ ΕΕ** <EN>**EU DECLARATION OF CONFORMITY** <FR>**DÉCLARATION UE DE CONFORMITÉ**
<HR>**IZJAVA EU-a O SUKLADNOSTI** <IT> **DICHIARAZIONE DI CONFORMITÀ UE** <LV>**ES ATBILSTĪBAS DEKLARĀCIJA**
<LT>**ES ATITIKTIES DEKLARACIJA** <HU>**EU–MEGFELELŐSÉGI NYILATKOZAT** <MT>**DIKJARAZZJONI TAL-KONFORMITÀ TAL-UE**
<NL>**EU-CONFORMITEITSVERKLARING** <PL>**DEKLARACJA ZGODNOŚCI UE** <PT>**DECLARAÇÃO UE DE CONFORMIDADE**
<RO>**DECLARAŢIE UE DE CONFORMITATE** <SK>**EÚ VYHLÁSENIE O ZHODE** <SL>**IZJAVA EU O SKLADNOSTI**
<FI>**EU-VAATIMUSTENMUKAISUUSVAKUUTUS** <SV>**EU-FÖRSÄKRAN OM ÖVERENSSTÄMMELSE**

1., 4. <DE> Gerätetyp / Produkt, Gegenstand der Erklärung - <BG> Тип на устройството / продукт, предмет на декларацията - <ES> Tipo de dispositivo / producto, objeto de dicha declaración - <CS> Typ zařízení / produkt, předmět prohlášení - <DA> Enhedstype / produkt, Erklæringens genstand - <ET> Seadme tüüp / toote, Deklareeritav toode - <EL> Τύπος συσκευής / προϊόν, Στόχος της δήλωσης - <EN> Device Type / Product, object of the declaration - <FR> Type d'appareil / produit, objet de la déclaration - <HR> Tip uređaja / proizvoda, Predmet izjave - <IT> Tipo di apparecchio / prodotto, oggetto della dichiarazione - <LV> Ierīces tipu / produkta, Deklarācijas priekšmets - <LT> Prietaisas tipas / gaminio, Deklaracijos objektas - <HU> Eszköz típusa/termék, a nyilatkozat tárgya - <MT> Tip ta 'apparat / prodott, għan tad-dikjarazzjoni - <NL> Type apparaat / product, Voorwerp van de verklaring - <PL> Rodzaj urządzenia / produktu, przedmiot deklaracji - <PT> Tipo do aparelho/produto, objeto da declaração - <RO> Dispozitiv tip / produs, obiectul declarației - <SK> Typ prístroja/výrobku, predmet vyhlásenia - <SL> Vrsta aparata/proizvod, predmet izjave - <FI> Laiteen tyyppi / tuote, vakuutuksen kohde - <SV> Enhetstyp / produkt, föremål för försäkran:

Type 171A / 171B **HYDRUS**

2. <DE> Name und Anschrift des Herstellers - <BG> Наименование и адрес на производителя - <ES> Nombre y dirección del fabricante - <CS> Jméno/název a adresa výrobce - <DA> Navn og adresse på fabrikanten - <ET> Tootja nimi ja aadress - <EL> Όνομα και διεύθυνση του κατασκευαστή - <EN> Name and address of the manufacturer - <FR> Nom et adresse du fabricant - <HR> Naziv i adresa proizvođača – <IT> Nome e indirizzo del fabbricante - <LV> Ražotāja nosaukums un adrese - <LT> Pavadinimas ir adresas gamintojo - <HU> A gyártó neve és címe - <MT> Isem u indirizz tal-manifattur - <NL> Naam en adres van de fabrikant - <PL> Nazwa i adres producenta - <PT> Nome e endereço do fabricante - <RO> Numele şi adresa producătorului - <SK> Meno a adresa výrobcu - <SL> Ime in naslov proizvajalca – <FI> Nimi ja osoite valmistajan - <SV> Namn och adress på tillverkaren:

Diehl Metering GmbH, Industriestrasse 13, D-91522 Ansbach

3. <DE> Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller - <BG> Настоящата декларация за съответствие е издадена на отговорността на производителя - <ES> La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante - <CS> Toto prohlášení o shodě se vydává na výhradní odpovědnost výrobce - <DA> Denne overensstemmelseserklæring udstedes på fabrikantens ansvar - <ET> Käesolev vastavusdeklaratsioon on välja antud tootja ainuvastutusel - <EL> Η παρούσα δήλωση συμμόρφωσης εκδίδεται με αποκλειστική ευθύνη του κατασκευαστή - <EN> This declaration of conformity is issued under the sole responsibility of the manufacturer - <FR> La présente déclaration de conformité est établie sous la seule responsabilité du fabricant - <HR> Za izdavanje ove izjave EU-a o sukladnosti odgovoran je samo proizvođač - <IT> La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante - <LV> Šī atbilstības deklarācija ir izdota vienīgi uz ražotāja atbildību - <LT> Ši atitikties deklaracija išduota gamintojui prisiimant visą atsakomybę - <HU> Ezt a megfelelőségi nyilatkozatot a gyártó kizárólagos felelőssége mellett adják ki - <MT> Din id-dikjarazzjoni tal-konformità tinħareġ taħt ir-responsabbiltà unika tal-manifattur - <NL> Deze conformiteitsverklaring wordt verstrekt onder volledige verantwoordelijkheid van de fabrikant - <PL> Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta - <PT> A presente declaração de conformidade é emitida sob a exclusiva responsabilidade do fabricante - <RO> Prezenta declaraţie de conformitate este emisă pe răspunderea exclusivă a producătorului - <SK> Toto vyhlásenie o zhode sa vydáva na výhradnú zodpovednosť výrobcu - <SL> Za izdajo te izjave o skladnosti je odgovoren izključno proizvajalec - <FI> Tämä vaatimustenmukaisuusvakuutus on annettu valmistajan yksinomaisella vastuulla - <SV> Denna försäkran om överensstämmelse utfärdas på tillverkarens eget ansvar.

5. <DE> Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union, soweit diese Anwendung finden: - <BG> Предметът на декларацията, описан по-горе, отговаря на съответното законодателство на Съюза за хармонизация, доколкото те се прилагат: - <ES> El objeto de la declaración descrita anteriormente es conforme con la legislación de armonización pertinente de la Unión, en la medida aplicable: - <CS> Výše popsaný předmět prohlášení je ve shodě s příslušnými harmonizačními právními předpisy Unie, pokud se vztahují: - <DA> Genstanden for erklæringen, som beskrevet ovenfor, er i overensstemmelse med den relevante EU-harmoniseringslovgivning, omfang de finder anvendelse: - <ET> Eelkirjeldatud deklareeritav toode on kooskõlas asjaomaste liidu ühtlustatud õigusaktidega, niivõrd kui neid kohaldatakse: - <EL> Ο στόχος της δήλωσης που περιγράφεται παραπάνω είναι σύμφωνος με τη σχετική ενωσιακή νομοθεσία εναρμόνισης, βαθμό που εφαρμόζονται: - <EN> The object of the declaration described above is in conformity with the relevant Union harmonisation legislation, insofar as it is applied: - <FR> L'objet de la déclaration décrit ci-dessus est conforme à la législation d'harmonisation de l'Union applicable: - <HR> Predmet gore opisane izjave u skladu je s mjerodavnim zakonodavstvom Unije o usklađivanju, onoj mjeri u kojoj se primjenjuju - <IT> L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa di armonizzazione dell'Unione, purché valgano - <LV> Iepriekš aprakstītais deklarācijas priekšmets atbilst attiecīgajam Savienības saskaņošanas tiesību aktam, ciktāl tas tie ir piemērojami: - <LT> Pirmiau aprašytas deklaracijos objektas atitinka susijusius derinamuosius Sąjungos teisės aktus, tiek, kiek jos taikomos - <HU> A fent ismertetett nyilatkozat tárgya megfelel a vonatkozó uniós harmonizációs jogszabálynak, amennyiben azok alkalmazhatóak - <MT> L-għan tad-dikjarazzjoni deskritta hawn fuq huwa konformi mal-leġiżlazzjoni ta' armonizzazzjoni rilevanti tal-Unjoni, safejn dawn applikati: - <NL> Het hierboven beschreven voorwerp is in overeenstemming de desbetreffende harmonisatiewetgeving van de Unie, voor zover van toepassing: - <PL> Opisany powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego, jeśli mające zastosowanie - <PT> O objeto da declaração acima descrito está em conformidade com a legislação de harmonização da União aplicável: - <RO> Obiectul declaraţiei descris mai sus este în conformitate cu legislaţia relevantă de armonizare a Uniunii, dacă aplicabil: - <SK> Uvedený predmet vyhlásenia je v zhode s príslušnými harmonizačnými právnymi predpismi Únie, čo je použiteľný: - <SL> Predmet navedene izjave je v skladu z ustrezno zakonodajo Unije o harmonizaciji, kot uporablja: - <FI> Edellä kuvattu vakuutuksen kohde on asiaa koskevan EUn yhdenmukaistamislainsäädännön vaatimusten mukainen, soveltuvin osin: - <SV> Föremålet för försäkran ovan överensstämmer med den relevanta harmoniserade unionslagstiftningen, i den mån tillämplig:

2014/30/EU (OJ L 96, 29.3.2014) **2014/32/EU** (OJ L 96, 29.3.2014) **2014/53/EU** (OJ L 153, 22.5.2014)

DoC_DMDE_CE124_10.docx - 1 -

6. <DE> Angabe der einschlägigen harmonisierten Normen oder normativen Dokumente, die zugrunde gelegt wurden, oder Angabe der anderen normativen Dokumente oder anderen technischen Spezifikationen, für die die Konformität erklärt wird: - <BG> Позоваване на използваните хармонизирани стандарти или нормативни документи или позоваване на други технически спецификации, по отношение на които се декларира съответствие: - <ES> Referencias a las normas armonizadas o documentos normativos pertinentes utilizados, o referencias a las otras especificaciones técnicas respecto a las cuales se declara la conformidad: - <CS> Odkazy na příslušné harmonizované normy nebo normativní dokumenty, které byly použity, nebo na jiné technické specifikace, ve vztahu k nimž se shoda prohlašuje: - <DA> Referencer til de relevante harmoniserede standarder eller anvendte normative dokumenter eller referencer til de andre tekniske specifikationer, som der erklæres overensstemmelse med: - <ET> Viited kasutatud harmoneeritud standarditele või normdokumentidele või viited muudele tehnilistele spetsifikatsioonidele, millele vastavust deklareeritakse: - <EL> Μνεία των σχετικών εναρμονισμένων προτύπων ή κανονιστικών εγγράφων που χρησιμοποιήθηκαν ή μνεία των λοιπών τεχνικών προδιαγραφών σε σχέση με τις οποίες δηλώνεται η συμμόρφωση: - <EN> References to the relevant harmonised standards or normative documents used or references to the other technical specifications in relation to which conformity is declared: - <FR> Références des normes harmonisées ou des documents normatifs pertinents appliqués ou références aux autres spécifications techniques par rapport auxquels la conformité est déclarée: - <HR> Upućivanja na relevantne primijenjene usklađene norme ili normativne dokumente ili upućivanja na druge tehničke specifikacije u vezi s kojima se izjavljuje sukladnost: - <IT> Riferimento alle pertinenti norme armonizzate o ai documenti normativi utilizzati o riferimenti alle altre specifiche tecniche in relazione alle quali è dichiarata la conformità. - <LV> Atsauces uz attiecīgajiem izmantojamiem saskaņotajiem standartiem vai normatīvajiem dokumentiem vai atsauces uz citām tehniskajām specifikācijām, attiecībā uz ko tiek deklarēta atbilstība: - <LT> Nuorodos į atitinkamus darniuosius standartus ar naudotus norminius dokumentus arba nuorodos į kitas techninės specifikacijas, pagal kurias deklaruota atitiktis; - <HU> Az alkalmazott harmonizált szabványokra hivatkozás, illetve a normatív dokumentumokra vagy azokra az egyéb műszaki leírásokra való hivatkozás, amelyekkel kapcsolatban megfelelőségi nyilatkozatot tettek: - <MT> Ir-referenzi għall-istandards armonizzati rilevanti jew dokumenti normattivi li ntużaw jew għall-ispeċifikazzjonijiet tekniċi l-oħra li fir-rigward tagħhom qed tiġi ddikjarata l-konformità: - <NL> Vermelding van de toegepaste relevante geharmoniseerde normen of normatieve documenten of vermelding van de overige technische specificaties waarop de conformiteitsverklaring betrekking heeft: <PL> Odniesienia do odpowiednich norm zharmonizowanych lub odpowiednich dokumentów normatywnych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku do których deklarowana jest zgodność: - <PT> Referências às normas harmonizadas aplicáveis ou aos documentos normativos utilizados ou às outras especificações técnicas em relação às quais é declarada a conformidade: - <RO> Trimiteri la standardele armonizate sau documentele normative relevante utilizate sau trimiteri la la alte specificații tehnice relevante în legătură cu care se declară conformitatea: - <SK> Odkazy na príslušné použité harmonizované normy alebo normatívne dokumenty alebo iné technické špecifikácie, v súvislosti s ktorými sa zhoda vyhlasuje: - <SL> Sklicevanja na zadevne harmonizirane standarde ali uporabljene normativne dokumente ali sklicevanja na druge tehnične specifikacije v zvezi s skladnostjo, ki je navedena v izjavi: - <FI> Viittaukset niihin asiaankuuluviin yhdenmukaistettuihin standardeihin tai ohjeellisiin asiakirjoihin, joita on käytetty, tai viittaus muihin teknisiin eritelmiin, joiden perusteella vaatimustenmukaisuusvakuutus on annettu: <SV> Hänvisningar till de relevanta harmoniserade standarder eller normerande dokument som använts eller hänvisningar till de andra normerande dokument eller andra tekniska specifikationer enligt vilka överensstämmelsen försäkras.

EN 55022:2010	**EN 14154:2005/A2:2011**	**OIML R49:2006**
EN 301 489-1 v1.9.2	**EN 301 489-3 v1.6.1**	**EN 300 220-2 v3.1.1**
EN 60950-1:2006/A2:2013	**WELMEC 7.2**	

<DE> Beteiligung notifizierter Stellen - <BG> Участие на нотифицираните органи <ES> Participación de los organismos notificados – <CS> Participace oznámené subjekty - <DA> Deltagelse de bemyndigede organer - <ET> Osalemine teavitatud asutuste – <EL>Συμμετοχή των κοινοποιημένων οργανισμών - <EN>Participation of notified bodies <FR> Participation des organismes notifiés – <HR> Sudjelovanje prijavljena tijela <IT> Il coinvolgimento degli organismi notificati - <LV> Iesaistīšana pilnvaroto iestāžu <LT> Dalyvavimas notifikuotosios įstaigos - <HU> Részvétel a bejelentett szervezetek - <MT> Involviment ta 'korpi notifikati - <NL> Deelneming aangemelde instanties – <PL> Uczestniczące jednostki notyfikowane - <PT> Envolvimento dos organismos notificados - <RO>Participante organismelor notificate - <SK> Účastnícke notifikované orgány - <SL> Udeležba priglašeni organi - <FI> Todistuksiin osallistuneet laitokset: - <SV> Deltagande anmälda organ:

LNE Paris (NB 0071)	**PTB Braunschweig und Berlin (NB 0102)**
Modul B (2014/32/EU) No. LNE-14586	**Modul D (2004/22/EG) No. DE-M-AQ-PTB004**

<DE> Unterzeichnet für und im Namen von - <BG> Подписано за и от името на: - <ES> Firmado por y en nombre de: - <CS> Podepsáno za a jménem: - <DA> Underskrevet for og på vegne af: - <ET> Alla kirjutanud eest ja nimel: - <EL> Υπογραφή για λογαριασμό και εξ ονόματος: - <EN> Signed for and on behalf of: - <FR> Signé par et au nom de: - <HR> Potpisano za i u ime: - <IT> Firmato a nome e per conto di: - <LV> Parakstīts šādas personas vārdā: <LT> Už ką ir kieno vardu pasirašyta: <HU> A nyilatkozatot a ... nevében és megbízásából írták alá: - <MT> Iffirmat għal u f'isem: <NL> Ondertekend voor en namens: - <PL> Podpisano w imieniu: - <PT> Assinado por e em nome de: - <RO> Semnat pentru și în numele: <SK> Podpísané za a v mene: - <SL> Podpisano za in v imenu: - <FI> ... puolesta allekirjoittanut – <SV> Undertecknat för:

Diehl Metering GmbH
Ansbach,
29.03.2017

ppa. Robert Zahn
<DE>Leiter Produktion - <BG>ръководител на производство
<ES>Jefe de producción - <CS>vedoucí výroby
<DA>leder af produktion - <ET>Head tootmise
<EL>Επικεφαλής της παραγωγής - <EN> Head of Production
<FR>chef de production - <HR>voditelj proizvodnje
<IT>capo della produzione - <LV>Vadītājs ražošanas
<LT>vadovas gamybos - <HU>Vezetője termelés
<MT>Kap tal-produzzjoni - <NL>hoofd van de productie
<PL>Szef produkcji - <PT>Chefe de produção
<RO>Şef de producţie - <SK>vedúci výroby
<SL>Vodja proizvodnje - <FI>Johtaja tuotannon
<SV>Chef för produktion

ppa. Philippe Vorburger
<DE>Leiter Entwicklung - <BG>ръководител на развитие
<ES> Jefe de desarrollo - <CS>vedoucí vývoje
<DA>leder af udvikling - <ET>Head areng
<EL>Επικεφαλής της ανάπτυξης - <EN> Head of R&D
<FR>Responsable du développement - <HR>voditelj razvoja
<IT>capo dello sviluppo - <LV>Vadītājs attīstības
<LT>vadovas plėtros - <HU>Fejlesztési vezető
<MT>Kap ta 'żvilupp - <NL>hoofd van de ontwikkeling
<PL>Szef rozwoju - <PT>Chefe de desenvolvimento
<RO>Şeful de dezvoltare - <SK>vedúci vývoja
<SL>Vodja razvoja - <FI>Johtaja kehitys
<SV>Chef för utveckling

DIEHL
Metering

smart in solutions

Konformitätserklärung

Declaration of Conformity

Diehl Metering GmbH
Industriestrasse 13
91522 Ansbach
GERMANY

DMDE-TW 128/3

Wir erklären hiermit, dass die Produkte
We hereby declare that the products

Type 171A/B - HYDRUS
(Gehäuseabmessungen lt. angefügter Liste / body dimensions as listed below)

von uns gefertigt worden sind und den Vorgaben der einschlägigen europäischen[1] sowie der nationalen[2] Vorschriften über die Trinkwasserqualität in ihrer jeweils gültigen Fassung entsprechen. Alle verwendeten Materialien entsprechen den UBA[3]- Anforderungen und der DVGW-Regel W270[4] in ihrer jeweils gültigen Fassung.

have been produced by us and meet the requirements of the valid european[1] and national[2] regulations for drinking water quality. All used materials are in accordance with the valid requirements of UBA[3] and DVGW W270[4].

Ansbach, 09.03.2017
Diehl Metering GmbH

ppa. Torsten Hägele
(Leiter Vertrieb)
(Head of Sales & Marketing)

ppa. Philippe Vorburger
(Leiter Entwicklung)
(Head of Research & Development)

derzeit: / at present:

[1] Richtlinie 98/83/EG des Rates vom 03.11.1998 über die Qualität von Wasser für den menschlichen Gebrauch, (ABl. L 330 vom 05.12.1998, S. 32)

[2] Trinkwasserverordnung in der Fassung der Bekanntmachung vom 10. März 2016 (BGBl. I S. 459), die durch Artikel 4 Absatz 21 des Gesetzes vom 18. Juli 2016 (BGBl. I S. 1666) geändert worden ist

[3] Bewertungsgrundlagen und Leitlinien des Umweltbundesamtes
(https://www.umweltbundesamt.de/themen/wasser/trinkwasser/trinkwasser-verteilen/bewertungsgrundlagen-leitlinien)

[4] DVGW Technische Regel Arbeitsblatt W270 (November 2007) Vermehrung von Mikroorganismen auf Werkstoffen für den Trinkwasserbereich – Prüfung und Bewertung

Seite 1 von 2

DIEHL
Metering

smart in solutions

DMDE-TW 128/3

Gehäuseabmessungen / body dimensions

DN 25 BL 260 FL 25mm
DN 32 BL 260 FL 32mm
DN 40 BL 300 FL 40mm
DN 50 BL 270 FL 50mm
DN 50 BL 300 FL 50mm
DN 50 BL 350 FL 50mm
DN 32 BL 190 FL 32 Oval
DN 40 BL 232 FL 40 Oval
DN 50 BL 311 FL 50 mm
DN 15 BL 110 G3/4B
DN 15 BL 170 G3/4B
DN 20 BL 110 G1B
DN 20 BL 130 G1B
DN 20 BL 175 G5/4B
DN 20 BL 190 G1B
DN 20 BL 220 G1B
DN 25 BL 135 G5/4B
DN 25 BL 150 G5/4B
DN 25 BL 175 G5/4B
DN 25 BL 260 G5/4B
DN 40 BL 200 G2B
DN 40 BL 300 G2B
DN 50 BL 270 G5/2B
DN 50 BL 300 G5/2B
5/8inch 3/4 BL191 / 7,5"
3/4inch 1 BL191 / 7,5"
3/4inch 1 BL229 / 9"
1inch 5/4 BL273 / 10,75"

Seite 2 von 2

CARSO - LABORATOIRE SANTÉ ENVIRONNEMENT HYGIÈNE DE LYON

Laboratoire Agréé pour les analyses d'eaux par le Ministère de la Santé

Laboratoire habilité par le Ministère chargé de la santé en application de l'article R*.1321-52 du code de la santé publique

ATTESTATION DE CONFORMITE SANITAIRE

Certificate of sanitary conformity

Conformément à l'arrêté du 29 mai 1997 modifié et à la circulaire du Ministère de la Santé
Direction Générale de la Santé DGS/SD7A N° 571 du 25 Novembre 2002

Coordonnées du demandeur d'ACS / *Contact details of the ACS owner* :

DIEHL Metering SAS
67, rue du Rhône
68304 SAINT-LOUIS Cedex

Nom de l'accessoire représentatif / Reference of the representative accessory :
Compteur / *Meter* HYDRUS DN15 longueur 110mm

N° de dossier attribué par le laboratoire habilité / *File reference* : **16 ACC LY 239**

Date de réalisation des essais d'inertie selon la norme XP P41-280 : du 17 au 27 Mai 2016.
Tests date (according to the standard XP P 41-280) : from Mai 17 to 27, 2016.

Commentaires / *Comments* : les résultats des essais sont conformes aux exigences de la circulaire DGS/SD7A N°571 du 25 Novembre 2002. *The results are in accordance with the requirements of the circular DGS/SD7A N°571 dated November 25, 2002*

Famille d'accessoires couverte par l'ACS / Accessories' family covered by this certificate :
Compteurs / *Meters*

Références / *References* (2 références) :

HYDRUS et HYDRUS T90
DN15, DN20

Attestation délivrée par / *Certificate issued by* : Christelle AUTUGELLE
Responsable MCDE
CARSO - L.S.E.H.L

Signature :

Date de délivrance / *Date of issue* : 06 Juin 2016
Date d'expiration / *Expiry date* : 06 Juin 2021
Commentaires / Comments : /

F_MC060-b 15/09/2014 MLN

CARSO - LABORATOIRE SANTÉ ENVIRONNEMENT HYGIÈNE DE LYON

Laboratoire Agréé pour les analyses d'eaux par le Ministère de la Santé

Laboratoire habilité par le Ministère chargé de la santé en application de l'article R*.1321-52 du code de la santé publique

ATTESTATION DE CONFORMITE SANITAIRE

Certificate of sanitary conformity

Conformément à l'arrêté du 29 mai 1997 modifié et à la circulaire du Ministère de la Santé
Direction Générale de la Santé DGS/SD7A N° 571 du 25 Novembre 2002

Coordonnées du demandeur d'ACS / *Contact details of the ACS owner* :

DIEHL Metering SAS
67, rue du Rhône
68304 SAINT-LOUIS Cedex

Nom de l'accessoire représentatif / Reference of the representative accessory :
Compteur / *Meter* HYDRUS DN40 longueur 300mm

N° de dossier attribué par le laboratoire habilité / *File reference* : **16 ACC LY 256**

Date de réalisation des essais d'inertie selon la norme XP P41-280 : du 23 Mai au 08 Juillet 2016.
Tests date (according to the standard XP P 41-280) : from May 23 to July 08, 2016.

Commentaires / *Comments* : les résultats des essais sont conformes aux exigences de la circulaire DGS/SD7A N°571 du 25 Novembre 2002. *The results are in accordance with the requirements of the circular DGS/SD7A N°571 dated November 25, 2002*

Famille d'accessoires couverte par l'ACS / Accessories' family covered by this certificate :
Compteurs / *Meters*

Références / *References* (2 références) :

HYDRUS et HYDRUS T90
DN25, DN32, DN40, DN50

Attestation délivrée par / *Certificate issued by* : Christelle AUTUGELLE
Responsable MCDE
CARSO - L.S.E.H.L.

Signature :

Date de délivrance / *Date of issue* : 13 Juillet 2016
Date d'expiration / *Expiry date* : 13 Juillet 2021
Commentaires / Comments : /

F_MC060-b 15/09/2014 MLN

Société par action simplifiée au capital de 2 283 622,30 Euros - RCS Lyon B 410 545 313 - SIRET 410 545 313 00042 - APE 743 B - N° TVA : FR 82 410 545 313
Siège Social : 4, avenue Jean Moulin - CS 30228 - F - 69633 VENISSIEUX cedex - Tél. : (33) 04 72 76 16 16 - Fax : (33) 04 78 72 12 11

DVGW
CERT
DVGW VP 5484
DVGW CERT ZP 4400

DVGW
CERT

certificate of conformity

OMS-Konformitätsbescheinigung

OG-4765CQ0513
Registration Number
Registriernummer

Field of Application ***Anwendungsbereich***	smart metering components *Smart-Metering Komponenten*
Owner of Certificate ***Zertifikatinhaber***	Diehl Metering GmbH Industriestraße 13, D-91522 Ansbach
Distributor ***Vertreiber***	Diehl Metering GmbH Industriestraße 13, D-91522 Ansbach
Product Category ***Produktart***	OMS components : undirectionally water meter (4465)
Product Description ***Produktbezeichnung***	OMS-interface for water meter with wireless M-bus
Model ***Modell***	HYDRUS 171 A/B
Test Reports ***Prüfberichte***	type testing: 15/256/4700/142 from 22.12.2015 (EBI) type testing: 17/150/4765/077 from 22.11.2017 (EBI)
Test Basis ***Prüfgrundlagen***	DVGW VP 5484 (01.07.2012) DVGW CERT ZP 4400 (draft 20.11.2017)
Date of Expiry / File No. ***Ablaufdatum / AZ***	22.12.2020 / 17-0181-GOR

30.01.2018 Kö A-1/2 i.A.
Date, Issued by, Sheet, Head of Certification Body
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 for certification of products for energy and water supply industry.

DVGW CERT GmbH ist von der DAkkS nach DIN EN ISO/IEC 17065:2013 akkreditierte Stelle für die Zertifizierung von Produkten der Energie- und Wasserversorgung.

DAkkS
Deutsche
Akkreditierungsstelle
D-ZE-16028-01-05

DVGW CERT GmbH
Zertifizierungsstelle
Josef-Wirmer-Str. 1-3
53123 Bonn
Tel. +49 228 91 88 - 888
Fax +49 228 91 88 - 993
www.dvgw-cert.com
info@dvgw-cert.com

A-2/2 **OG-4765CQ0513**

Type ***Typ***	**Technical Data** ***Technische Daten***	**Remarks** ***Bemerkunger***
HYDRUS 171 A/B	OMS-interface: T1 protocol: M-bus center frequency: 869,95 MHz	

Type Variation ***Ausführungsvariante***	**Explanations** ***Erläuterungen***
HYDRUS 171 A/B	basic device for water meters; examination according to the OMS-Conformance Test Vol. 1-4, Version 2.0.0, Edition: 10.2013
HYDRUS 171 A/B	for ultrasonic water meters; Examination according to OMS-CT Generation 4 (05.2016); Open Metering Conformance Test, Volume 1-4

Hints of Utilization / Remarks
Verwendungshinweise / Bemerkungen

The counter and metering system were not part of the type testing.
The tests refers solely to the examination of the M-bus acc. to the OMS-conformance test vol. 1-4

variation 1: version 2.0.0, dated: 10.2013
Typ: 07h
Encryption mode: 5
Mobile transmission interval: 12s
Installation telegram: non
Static telegram: non
Performance class: HT
Temperature range: +1°C ... +70°C
Power supply: battery
R&TTE-authorization: 69560-24261-02 (TÜV Süd)

variation 2: version 4.0.0, dated: 05.2016
Typ: 0x07h
Encryption mode: 7
Synchronous transmission interval: 900s
Mobile transmission interval: 12s
Installation telegram: non
Static telegram: non
Performance class: HT
Temperature range: +1°C ... +70°C
Power supply: battery
R&TTE-authorization: 69560-24261-02 (TÜV Süd)

Produkte
Products

DAkkS

TÜVRheinland®

Prüfbericht-Nr.: *Test Report No.:*	**21239795-002**	**Auftrags-Nr.:** *Order No.:*	E6781/ 3151801	Seite 1 von 6 *Page 1 of 6*
Kunden-Referenz-Nr.: *Client Reference No.:*	n.a.	**Auftragsdatum:** *Order date:*	July 13, 2015	
Auftraggeber: *Client:*	Diehl Metering GmbH, Mr Ottmar Oeder, Industriestr. 13, 91522 Ansbach			
Prüfgegenstand: *Test item:*	1 heat meter HYDRUS			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	type: 171A			
Auftrags-Inhalt: *Order content:*	IP- protection degree tests: IPX8			
Prüfgrundlage: *Test specification:*	DIN EN 60529:2014-09 (partial test) Degrees of protection provided by enclosures (IP Code)			

Wareneingangsdatum: *Date of receipt:*	July 15, 2015
Prüfmuster-Nr.: *Test sample No.:*	A000102949-001
Prüfzeitraum: *Testing period:*	July 20, 2015 – July 23, 2015
Ort der Prüfung: *Place of testing:*	Nuremberg / Germany
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland LGA Products GmbH
Prüfergebnis*: *Test result*:*	Siehe Sonstiges / See Other

geprüft von / *tested by:*

Datum / *Date*	Name / Stellung / *Name / Position*	Unterschrift / *Signature*
Sept. 08, 2015	Klaus-Dieter Ittner (SV)	

kontrolliert von / *reviewed by:*

Datum / *Date*	Name / Stellung / *Name / Position*	Unterschrift / *Signature*
Sept. 08, 2015	Dipl.-Ing. (FH) Matthias Baumann (LL)	

Sonstiges / *Other:* see findings

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V04

TÜV Rheinland LGA Products GmbH · Tillystraße 2 · D - 90431 Nürnberg · Tel.: +49 911 655 5225 · Fax: +49 911 655 5226
Mail: service@de.tuv.com · Web: www.tuv.com

3. Housing variants

Permanent flow rate	Q3	m³/h	1.6	1.6	1.6	1.6	1.6	2.5	2.5
Nominal Diameter	DN	mm	15	15	15	20	20	15	15
Overall length	L	mm	110	165	170	130	190	110	165
Connection			G¾B	G¾B	G¾B	G1B	G1B	G¾	G¾
Overload flow rate*	Q4	m³/h	2	2	2	2	2	3.125	3.125
Transitional flow rate*	Q2	l/h	10.24	10.24	10.24	10.24	10.24	16	16
Minimum flow rate*	Q1	l/h	6.4	6.4	6.4	6.4	6.4	10	10
Starting flow rate		l/h	1.3	1.3	1.3	1.3	1.3	2.6	2.6
Pressure loss at Q3	bar		0.6	0.6	0.6	0.6	0.6	0.33	0.33
Strainer / Non-return valve			Optional / Optional	Optional / Optional	Optional / Optional	Optional / Optional	Optional / Optional	Optional / Optional	Optional / Optional

* At Dynamic R 250

Permanent flow rate	Q3	m³/h	2.5	2.5	2.5	4	4	4	4
Nominal Diameter	DN	mm	15	20	20	20	20	20	20
Overall length	L	mm	170	130	190	110	130	175	190
Connection			G¾B	G1B	G1B	G1B	G1B	G1¼	G1B
Overload flow rate*	Q4	m³/h	3.125	3.125	3.125	5	5	5	5
Transitional flow rate*	Q2	l/h	16	16	16	25.6	25.6	25.6	25.6
Minimum flow rate*	Q1	l/h	10	10	10	16	16	16	16
Starting flow rate		l/h	2.6	2.6	2.6	4.3	4.3	4.3	4.3
Pressure loss at Q3	bar		0.33	0.25	0.25	0.3	0.3	0.3	0.3
Strainer / Non-return valve			Optional / Optional	Optional / Optional	Optional / Optional	Optional / Without	Optional / Optional	Optional / Without	Optional / Optional

* At Dynamic R 250

Permanent flow rate	Q3	m³/h	6.3	6.3	6.3	6.3	6.3	10	10
Nominal Diameter	DN	mm	25	25	25	25	32	25	25
Overall length	L	mm	135	150	175	260	260	135	150
Connection			G1¼	G1¼	G1¼	G1¼ / FL 25	G1½B / FL 32	G1¼	G1¼
Overload flow rate*	Q4	m³/h	7.87	7.87	7.87	7.87	7.87	12.5	12.5
Transitional flow rate*	Q2	l/h	50.4	50.4	50.4	50.4	50.4	80	80
Minimum flow rate*	Q1	l/h	31.5	31.5	31.5	31.5	31.5	50	50
Starting flow rate		l/h	10	10	10	10	10	10	10
Pressure loss at Q3	bar		0.25	0.25	0.25	0.25	0.25	0.55	0.55
Strainer / Non-return valve			Integrated / Without	Integrated / Without	Integrated / Optional	Integrated / Optional	Integrated / Optional	Integrated / Without	Integrated / Without

* At Dynamic R 200

Permanent flow rate	Q3	m³/h	10	10	10	10	10	16	16
Nominal Diameter	DN	mm	25	25	32	40	40	40	40
Overall length	L	mm	175	260	260	200	300	200	300
Connection			G1¼	G1¼ / FL 25	G1½B / FL 32	G2B	G2B / FL 40	G2B	G2B / FL 40
Overload flow rate*	Q4	m³/h	12.5	12.5	12.5	12.5	12.5	20	20
Transitional flow rate*	Q2	l/h	80	80	80	80	80	128	128
Minimum flow rate*	Q1	l/h	50	50	50	50	50	80	80
Starting flow rate		l/h	10	10	10	16	16	16	16
Pressure loss at Q3	bar		0.55	0.55	0.55	0.1	0.1	0.24	0.24
Strainer / Non-return valve			Integrated / Optional	Integrated / Optional	Integrated / Optional	Integrated / Without	Integrated / Optional (G2B)	Integrated / Without	Integrated / Optional (G2B)

* At Dynamic R 200

Permanent flow rate	Q3	m³/h	16	16	25	25
Nominal Diameter	DN	mm	50	50	50	50
Overall length	L	mm	270	300	270	300
Connection			G2½B / FL 50	G2½B / FL 50	G2½B / FL 50	G2½B / FL 50
Overload flow rate*	Q4	m³/h	20	20	31.25	31.25
Transitional flow rate*	Q2	l/h	128	128	200	200
Minimum flow rate*	Q1	l/h	80	80	125	125
Starting flow rate		l/h	25	25	25	25
Pressure loss at Q3	bar		0.1	0.1	0.25	0.25
Strainer / Non-return valve			Without / Without	Without / Without	Without / Without	Without / Without

* At Dynamic R 200

- All available variants can be found in the HYDRUS data sheet.

Contents

Non-return valve

The meter can be supplied with a non-return valve (accessory) on request (only for nominal diameters DN 15 – 40).
The non-return valve must be mounted in the meter outlet as shown in **Fig. I** for meters with a nominal diameter of DN 15 and in **Fig. II** for a nominal diameter of DN 20 and DN 40.
For meters with a nominal diameter of DN 25 and DN 32, a compensating ring must also be used to centre the non-return valve **(Fig. III)**.

Fig. I

DN 15

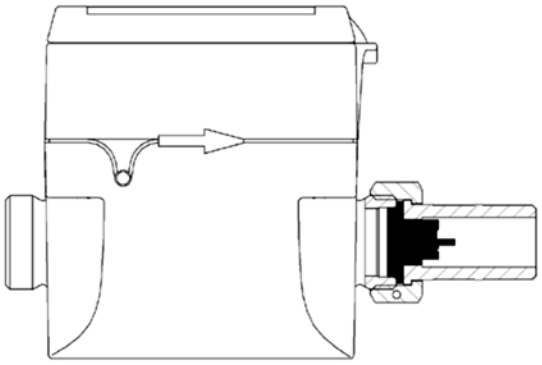


Fig. II

DN 20 / DN 40

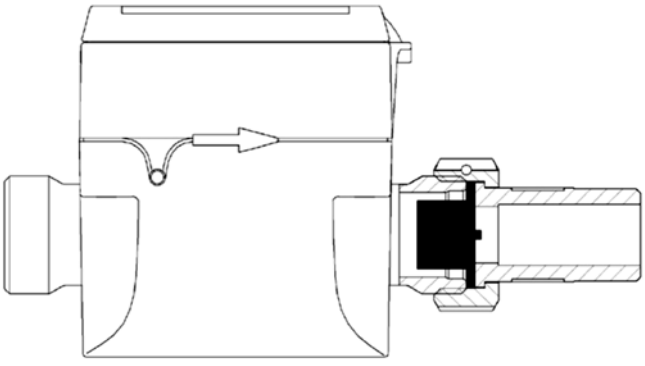
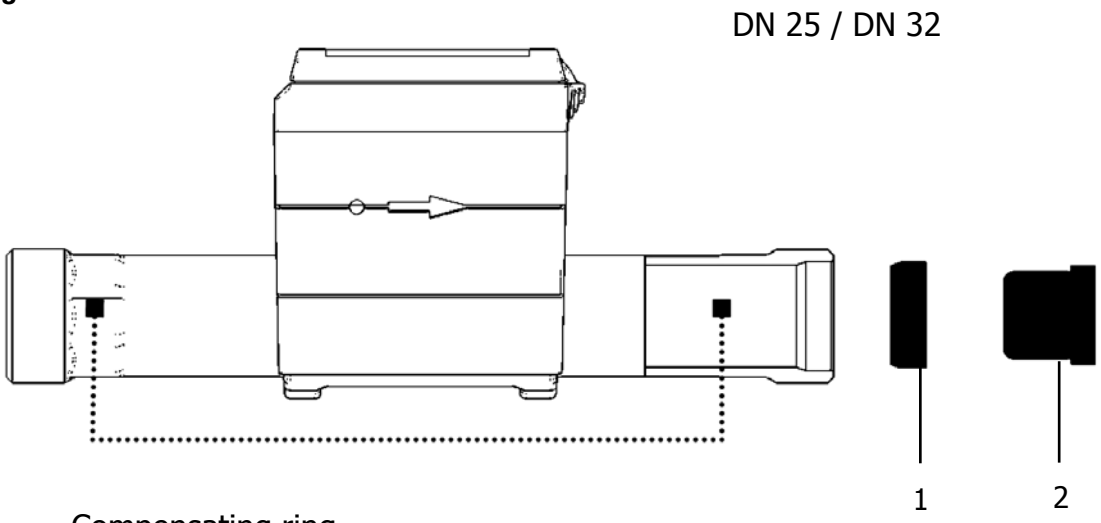


Fig. III



1 Compensating ring
2 Non-return valve

Coupling fitting with collar

In order to prevent damage to the non-return valve, there is a PE seal for the non-return valve **(Fig. II and III)** and coupling fitting with collar combination.
During the installation, the water meter must be held in this position **(see fig. III)** with a suitable tool to prevent damage to the plastic housing.

4. Materials

Components in contact with medium

Coupling housing	Lead-free brass, UBA conformity for screw thread according to ISO 228-1, UBA conformity for flange housing according to DIN 2501
Measuring insert	Composite, KTW conformity
O-Rings	EPDM
Locating studs	PES / PPS glass-fibre reinforced
Reflectors	Stainless steel, stainless
Ultrasonic transducers	Composite, KTW conformity

Other components

Cover + meter housing	UV resistant composite housing

5. Technical data

Electrical data

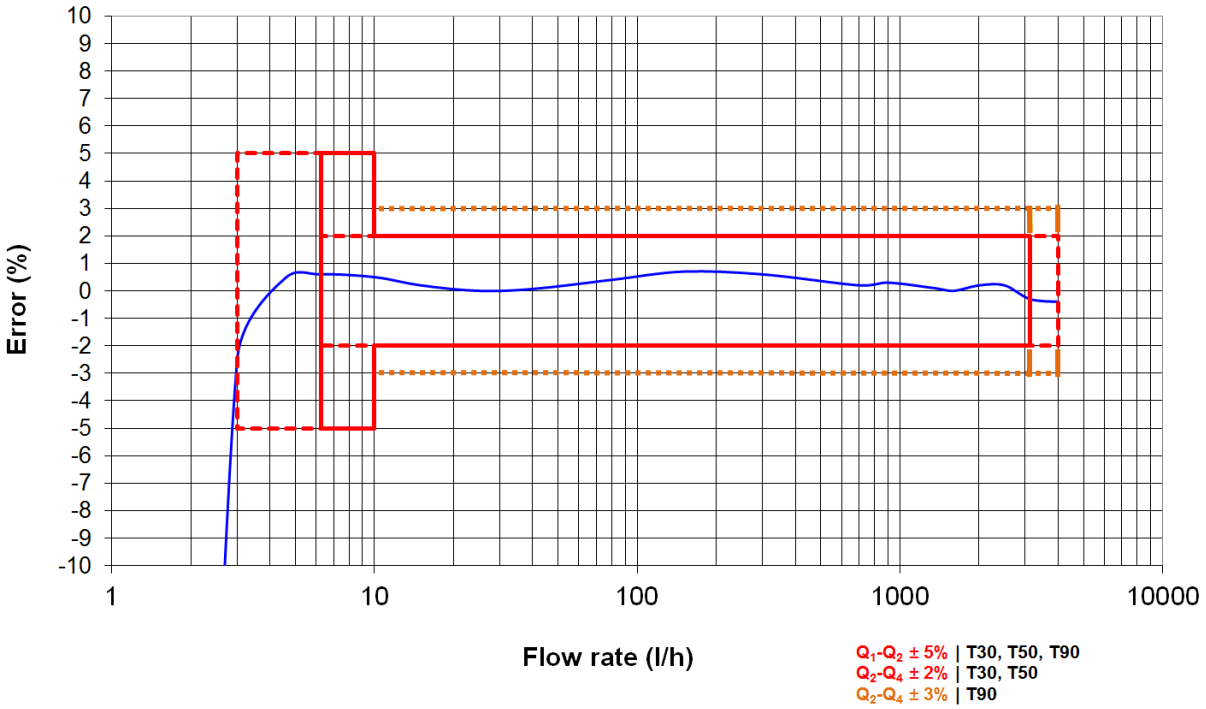
Power Supply	Two 3.6 VDC lithium-batteries (only one battery with wired M-Bus possible)
Battery lifetime T30*/T50*	Up to 12 years (one battery), up to 16 years (two batteries)
Battery lifetime T90*	Up to 12 years (all interfaces)
	*The battery life depends on the transmission interval of the radio telegram, the telegram length and the ambient temperature at the installation location
	Batteries cannot be replaced
LC display	8-digit
EMC data	MID class E1+E2

Mechanical data

Metrological class	OIML R 49 class 2
Ambient class	OIML R 49 class C
Ambient temperature	1 … 70 °C
Protection class	IP 68
Installation	Frost-free installation indoors or outdoors, in a shaft or installation box, resistant to UV rays
Medium temperature	0.1 … 90 °C
Storage temperature	-20 … +70 °C (>35 °C max. 4 weeks)
Nominal pressure	PN16

Accuracy

Accuracy class 2



T30, T50:
± 5 % in the range Q1 ≤ Q < Q2
± 2 % in the range Q2 ≤ Q ≤ Q4

T90:
± 5 % in the range Q1 ≤ Q < Q2
± 3 % in the range Q2 ≤ Q ≤ Q4

6. Product design

6.1 14-digit manufacturer number

The 14-digit manufacturer number based on the German standard DIN 43863-5.

Structure of the number:

The 14-digit manufacturer number consists of several components.

Division + Manufacturer + Manufacturer ID + 8-digit serial number of the meter

8 for cold water meter (Medium temperature 30°C)
9 for hot water meter (Medium temperature 50°C up to 90°C)

+

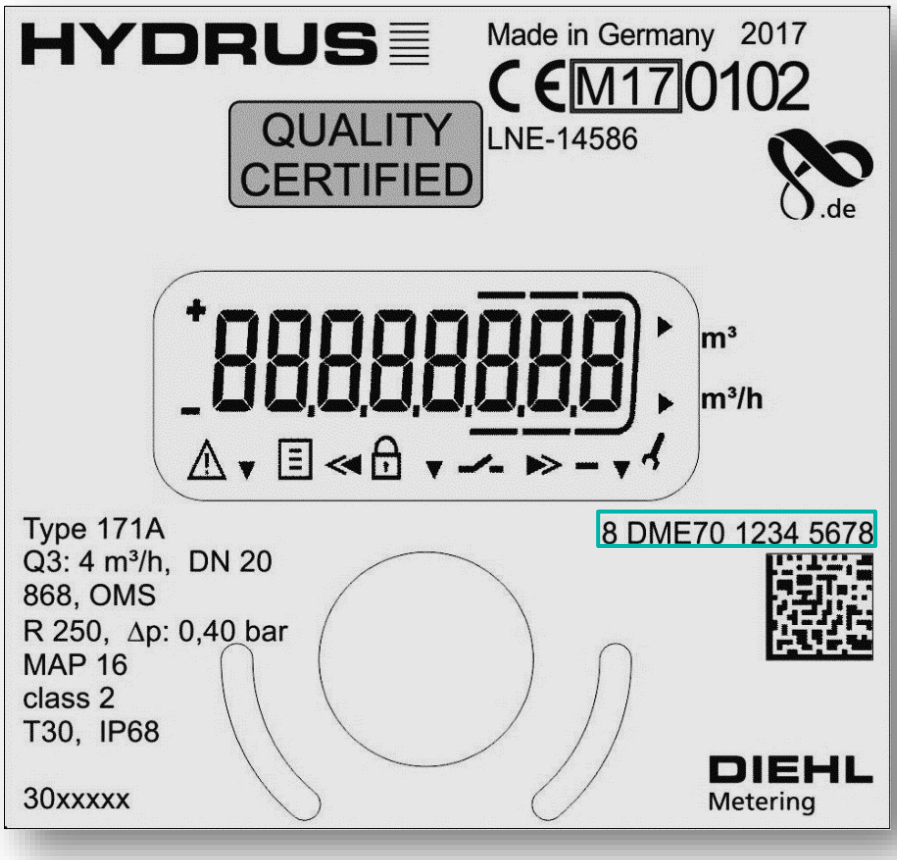
DME Manufacturer (manufacturer identification)

+

70 Manufacturer ID (associated device ID)

+

1234 5678 Serial number of the meter



6.2 Layout of meter labelling – selection by customer

4 different meter labelling variants are available for selection.

1) Diehl Metering standard design

2) Customer design 1 – without bar code

3) Customer design 2 – with bar code

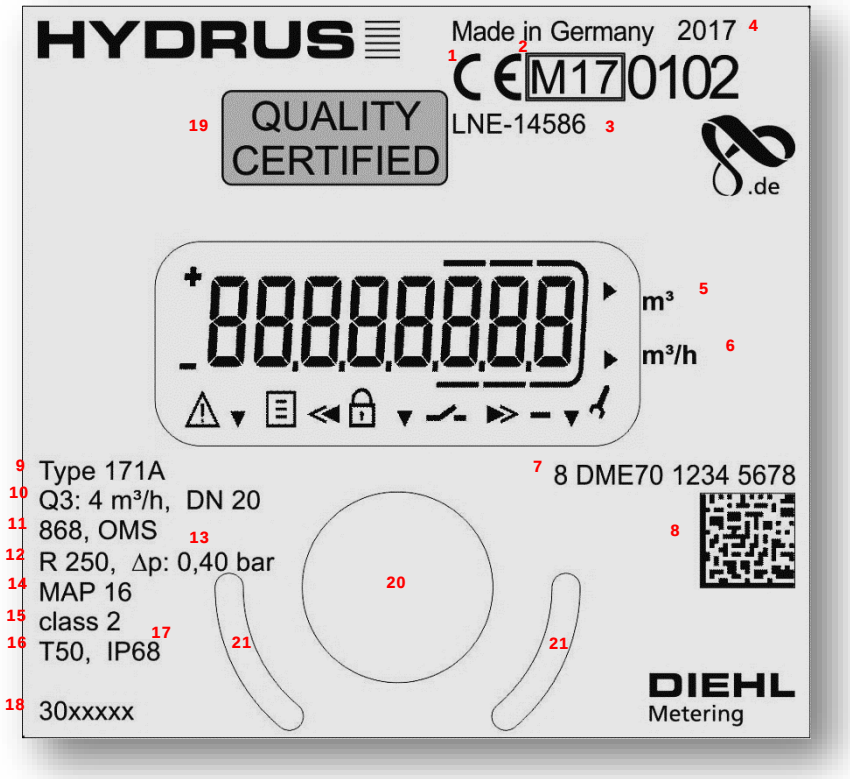
4) Customer design 3 – with bar code

Please tick your preferred layout and note the procedure.

Note the following remarks:

- A customer serial number is not possible with the 14-digit fabrication number, because of that **Customer design 3 – with bar code** is available for Selection
- The removable cover of HYDRUS cannot be lasered
- Stickers cannot be attached
- Content of the Data-Matrix Code: 14-digit fabrication number + article number

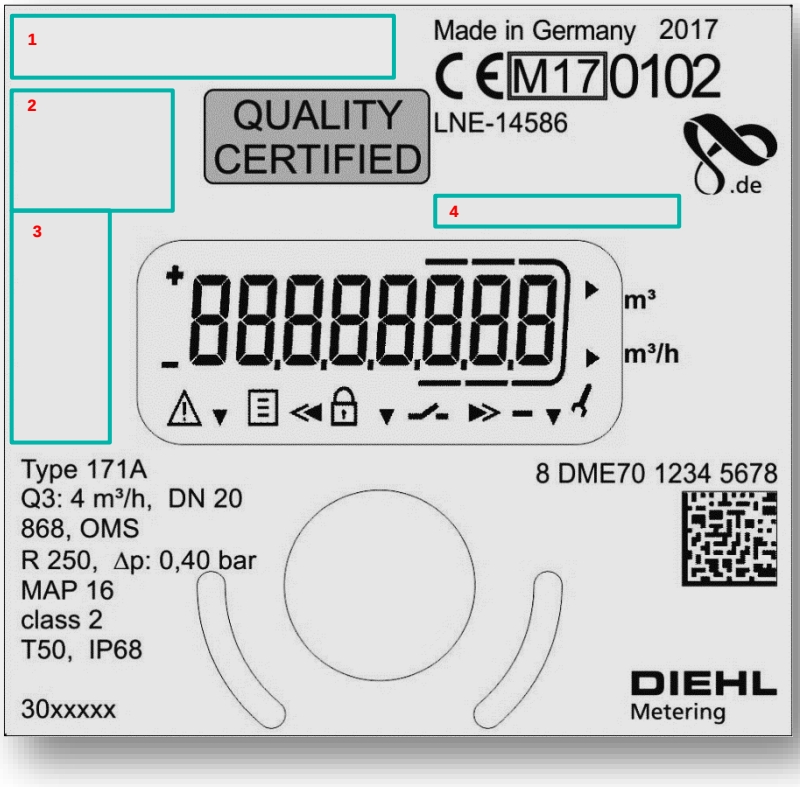
☐ 1) Diehl Metering standard design



1	Conformity marking
2	Year of declaration of conformity
3	Type examination certificate number
4	Year of manufacture
5	Water volume
6	Flow rate
7	14-digit manufacturer number
8	Data-Matrix Code
9	Type designation
10	Nominal flow rate, Nominal diameter
11	Interface
12	Dynamic
13	Pressure loss class
14	Nominal pressure
15	Metrological class
16	Max. medium temperature
17	Protection class
18	Article number
19	Seal
20	Optical button / optical interface
21	Optohead positioning aid

☐ 2) Customer design 1 – without bar code

The following changes can be made to the layout in the areas marked 1, 2, 3 and 4.



1 = Product name (Standard HYDRUS)

2&3 = Customer logo, in vector-orientated format (e.g. .dxf, .dwg .eps) or free text

4 = Customer text (e.g. customer article number

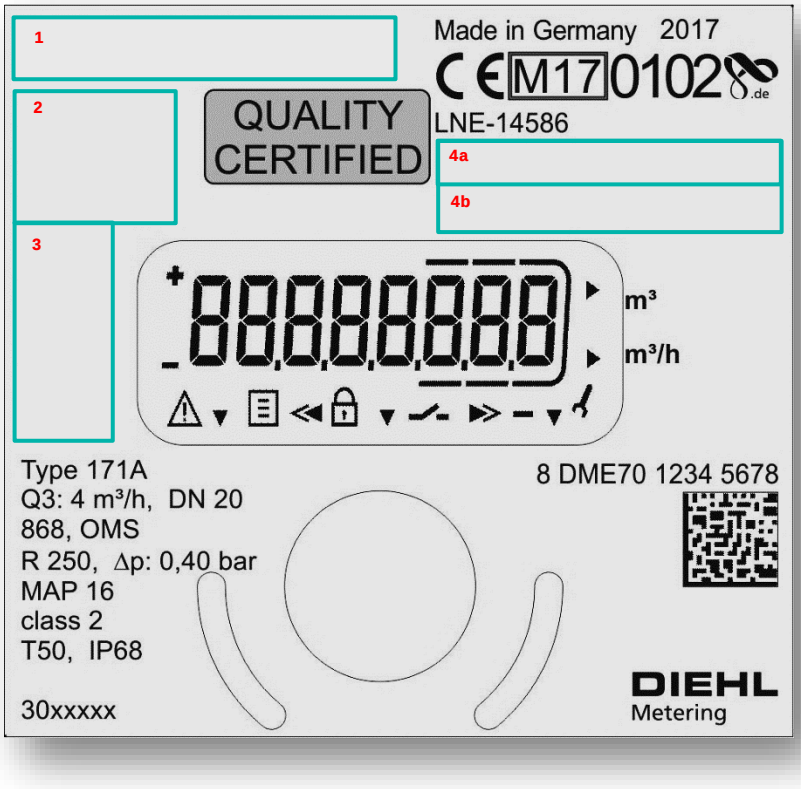
Procedure

1. Enter the file name of the desired graphics and/or text in the table below.
2. Or, if applicable, enter the desired specifications in the table below.
3. **Please provide us with the logo in vector-orientated format via E-Mail.**

	Specification
1. Product name	
2. Logo (.dxf, .dwg, .eps)	
3. Logo (.dxf, .dwg, .eps)	
4. Customer text	

☐ 3) Customer design 2 – with bar code

The following changes can be made to the layout in the areas marked 1, 2, 3, 4a and 4b.



1 = Product name (Standard HYDRUS)

2&3 = Customer logo, in vector-orientated format (e.g. .dxf, .dwg .eps) or free text

4 = a Bar code (e.g. Type 128)

and

4 = b Customer text (e.g. bar code content)

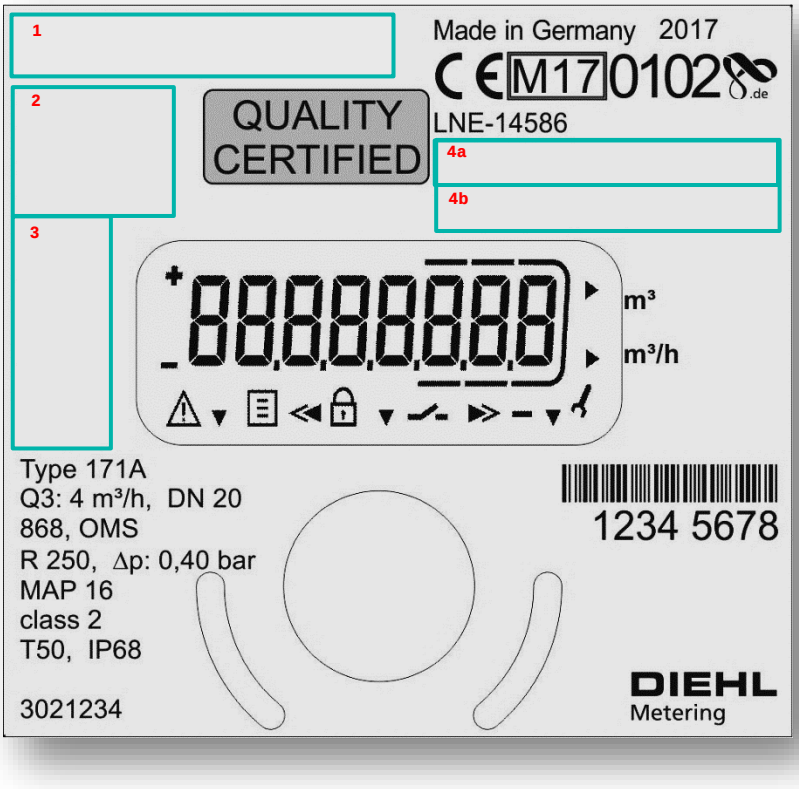
Procedure

1. Enter the file name of the desired graphics and/or text in the table below.
2. Or, if applicable, enter the desired specifications in the table below.
3. **Please provide us with the logo in vector-orientated format via E-Mail.**

	Specification
1. Product name	
2. Logo (.dxf, .dwg, .eps)	
3. Logo (.dxf, .dwg, .eps)	
4a. Barcode (z.B. Type 128)	
4b. Customer text	

4) Customer design 3 – with bar code

This layout can be used if a customer serial number is required. The following changes can be made to the layout in the areas marked 1, 2, 3, 4a and 4b.



1 = Product name (Standard HYDRUS)

2&3 = Customer logo, in vector-orientated format (e.g. .dxf, .dwg .eps) or free text

4 = a Bar code (e.g. Type 128)

and

4 = b Customer text (e.g. bar code content)

Procedure

1. Enter the file name of the desired graphics and/or text in the table below.
2. Or, if applicable, enter the desired specifications in the table below.
3. **Please provide us with the logo in vector-orientated format via E-Mail.**

	Specification
1. Product name	
2. Logo (.dxf, .dwg, .eps)	
3. Logo (.dxf, .dwg, .eps)	
4a. Bar code (e.g. Type 128)	
4b. Customer text	

6.3 Layout of box label – selection by customer

2 different variants are available for selection for the layout of the box label.

1) Diehl Metering standard box label

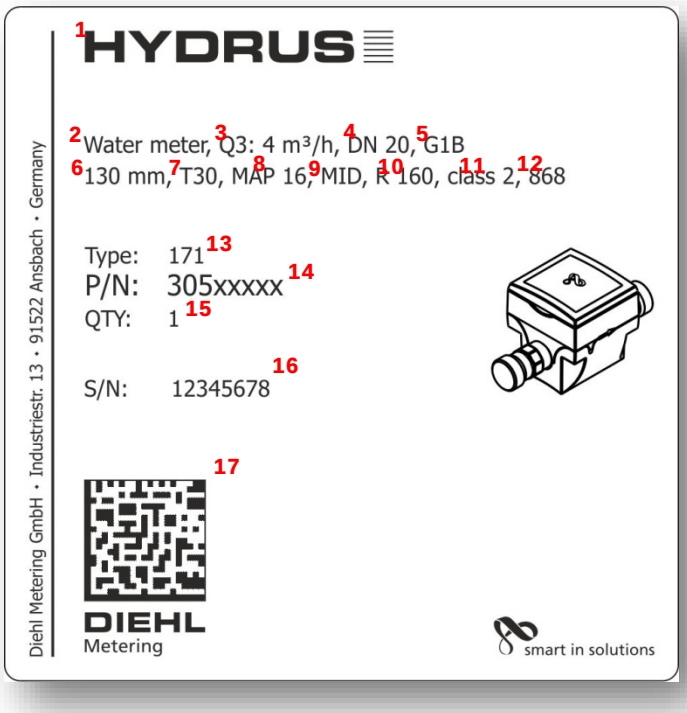
2) Customer box label

Please tick your preferred layout and note the procedure.

Note the following remarks:

- Content of the Data-Matrix Code: Article number; 14-digit fabrication number;Quantity 1 piece

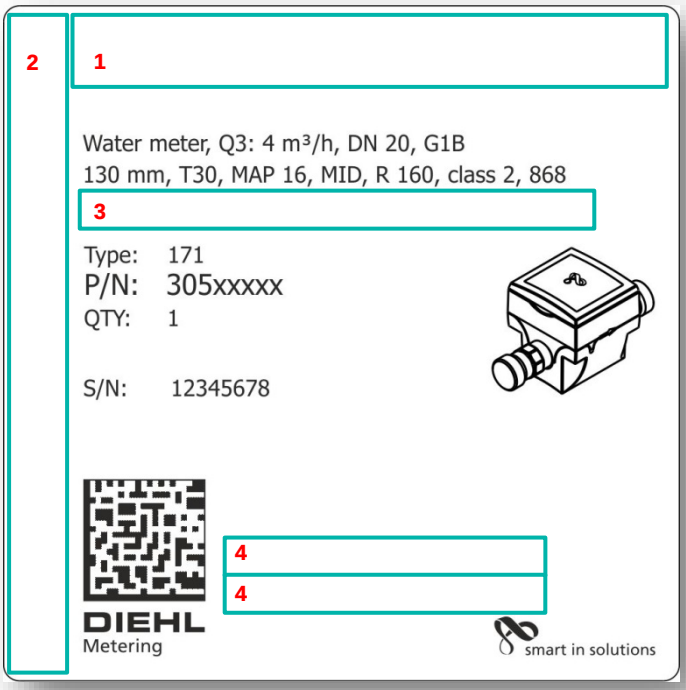
☐ 1) Diehl Metering standard box label



1	Product name
2	Meter type
3	Nominal flow rate
4	Nominal diameter
5	Connection
6	Body length
7	Temperature in °C
8	Nominal pressure
9	Approval
10	Dynamic range
11	Metrological class
12	Communication interfaces
13	Type designation
14	Diehl Metering article number
15	Quantity
16	Serial number
17	Data-Matrix Code

☐ 2) Customer box label

The following changes can be made to the layout in the areas marked 1, 2, 3 and 4.



1 = Product name/customer logo (in vector-orientated format (e.g. .dxf, .dwg .eps) or free text

2 = Address

3 = Additional meter features are possible (e.g. power supply)

4 = Other customer information possible (2 lines possible)

Procedure

1. Enter the file name of the desired graphics and/or text in the table below
2. Or, if applicable, enter the desired specifications in the table below
3. **Please provide us with the logo in vector-orientated format via E-Mail**

	Specification
1. Product name / logo (.dxf, .dwg, .eps)	
2. Address	
3. Additional meter features	
4. Customer information	

7. Communication / interfaces

Note: A detailed description of the communication interfaces (wired and wireless M-Bus) can be found in the Communication Description on our home page www.diehl.com/metering.

HYDRUS is equipped with different communication interfaces depending on the variant selected:

- Optical IrDA interface (standard - always)
- Radio 434 / 868 MHz
- Radio 868 MHz / L-Bus
- Radio 434 MHz / L-Bus
- M-Bus
- Pulse

Optical

The optical IRDA interface has a dual function. First it is used as optical button and second as communication interface.

Optical button:

This is used for switching to the next display and operating the LC display. If the button is not pressed for about 4 minutes, the meter switches to sleep mode, i.e. the display is off but the meter is still in operation and records all data.
The LC display can be taken into operation by pressing the button or by opening the cover.
After being taken into operation, the current status appears in the LC display for approx. 2 seconds, then the error message (if an error exists), e.g. E - 7 - A - - - (air in the pipe, ex works state).

Optical interface:

Communication with the meter is possible over the optical IRDA interface with the aid of an opto head together with a laptop or PC and the associated IZAR@MOBILE 2 software.
Display information and the radio telegram can be configured to the customer's requirements over the optical interface, but it is recommended that the desired configuration is agreed ex works before placing the order; if no prior agreement is made, the ex works setting is used.
The optical interface can also be used together with an opto head for carrying out quick tests using suitable electronic test beds.

Radio

HYDRUS can send radio protocols with different standards (OMS or Real Data). OMS and Real Data protocols can be sent with a frequency of 868 or 434 MHz. The radio protocols for Open Metering and Real Data have the same content but are encrypted differently. The protocol type (OMS or Real Data) can only be set ex works and cannot be changed in the field.

The integrated radio function is switched off on delivery and the meter is set to "storage mode", in which HYDRUS starts an ultrasonic measurement every minute. The meter activates itself automatically (field mode) on detecting water in the measuring tube and starts measuring every two seconds. The integrated radio function is activated at the same time; the radio remains permanently active after continuous operation (> 3 hours) with water. The radio in HYDRUS can also be activated or deactivated with IZAR@MOBILE 2 software.

HYDRUS sends unidirectionally in the T1 radio mode.

OMS Version:
- Generation 3, Encryption Mode 5, Profile A **(OMS-Certificate of conformity see point 2)**

or

- Generation 4, Encryption Mode 7, Profile B **(OMS-Certificate of conformity see point 2)**

Data security OMS3:

HYDRUS sends in OMS 3 according to EN13757-4. Different encryption methods are available:

Encryption methods OMS 3:

DES key (Data Encryption Standard): Used in Real Data

- 8-byte hexadecimal (16-digit h0-hF, 64-bit)

AES key (Advanced Encryption Standard): Used in OMS

- 16-byte hexadecimal (32-digit h0-hF, 128-bit)
- Standard key for the variant is used unless otherwise requested
- Individual key for the variant possible
- Individual key per meter is possible

Data Security OMS 4:

The OMS defines in Version 4 three security profiles A, B and C. The requirements of the Profile B correspond to the primary communication of the security mode 7 from EN13757-7. Session keys are used to individually encrypt each data telegram. HYDRUS therefore has one security concept for highest data security and is compatible with the Smart Meter Gateway according to the „German Bundesamt für Sicherheit in der Informationstechnik" (BSI).

Technology OMS 4:

Securing transmission according to EN13757-7 Mode 7:

- Encryption (Encryption) is used to protect integrity and confidentiality.
- To protect the authenticity, a message authentication code (MAC) is generated from the data and another key.
- New keys are used for each transmission.

Thus, two new keys are used before each radio transmission:
The two keys are derived from a "master key" (key derivation) before each transmission (by the firmware of the meter). For secure keys to be generated and at the same time the same keys can be generated at another location (MDM= Meter Data Management), a number (four bytes) is used for the derivation, which is transmitted in encrypted form in the transmission. An individual master key, which must also be known in the MDM, is therefore required in each meter.

Encryption methods OMS 4:

AES-Key (Advanced Encryption Standard): Verwendet in OMS

- 16 Byte Hexadezimal (32-stellig h0-hF, 128 Bit)
- **Individual key per meter is possible**

➔ The individual key per meter is generated in an electronic delivery note (EDN).
➔ When creating the EDN, the following information are required:

1. In welchem Format ist der EDN zu erstellen?

- For third-party software or IZAR@NET before Version 2.4
- For IZAR@NET from 2.4
- For Elster ACM-modules

2. The following information is required for sending the EDN:

- A contact person (E-Mail address, postal address)

-> Must be deposited in the order by order input of the Diehl Metering sales person

Scheme of the Open Metering telegram:

Byte Nr:	Designation	Description	
1	L-Field	Without L-Field and CRCs (max. 254 Bytes)	
2	C-Field	C-Feld = 0x44 in Normal Mode	
3	ManId0		
4	ManId1		
5	A-Field SAd0		
6	A-Field SAd1		
7	A-Field SAd2		
8	A-Field SAd3		
9	A-Field SwId		
10	A-Field Medium		
11	CRC1		
12	CRC0		
13	CI-Field	CI-Feld = 0x7A,because 4 Byte Header are following	
14	Access No	Transmission counter	
15	State	M-Bus Status Byte	
16	Signature0	Information about encryption and block number	
17	Signature1		
18	AES-Verify 0		AES-Encrypted Block 1
19	AES-Verify 1		
20	Data1	Data Records	
21	Data2	Data Records	
22	Data3	Data Records	
23	Data4	Data Records	
24	Data5	Data Records	
25	Data6	Data Records	
26	Data7	Data Records	
27	Data8	Data Records	
28	Data9	Data Records	
29	CRC1		

M-Bus Status Byte in the radio telegram:

The M-Bus Status Byte (Byte Nr. 15) is transmitted in every open metering radio telegram. The status byte indicates which errors/alarms are currently on the meter (hexadecimal coded).

Bit	Description	Usage
0	Reserved	-
1	Any application error	-
2	Power low	Alarm 9
3	Permanent error	Error C1
4	Temporary error	Error E1, Error E4, Error E7, Alarm A4, Alarm A5, Alarm A3, Alarm A1, Alarm A6, Alarm A7
5	Manufacturer specific	*1)
6	Manufacturer specific	*1)
7	Manufacturer specific	*1)

*1)

Error/Alarm	Error E1 or Error E4	Error E7	Alarm A4	Alarm A3 or Alarm A5	Alarm A1	Alarm A6	Alarm A7
Status Byte	0x10	0x30	0x70	0x90	0xB0	0xD0	0xF0

Priority from the left to the right.

The error E1 and E4, and respectively the alarm A3 and A5 are at the same status byte. Thus it can't be differenciated whether E1 and/or E4, respectively A3 and/or A5 are on the meter when the meter detects simultaneously E1 and E4 or simultaneously A3 and A5. All errors and alarms can be determined and differenciated via the manual optical readout of the error log.

Error C1 and alarm A9 can be displayed thus always in the M-bus status byte.

The specified hexadecimal value must then be converted to a binary value:

Error / alarm	**Coding**
Error C1	xxxx 1xxx
Alarm A9	xxxx x1xx
Error E1 or Error E4	0001 xxxx
Error E7	0011 xxxx
Alarm A4	0111 xxxx
Alarm A5 or Alarm A3	1001 xxxx
Alarm A1	1011 xxxx
Alarm A6	1101 xxxx
Alarm A7	1111 xxxx

Example hexadecimal 30 -> 0011 0000 -> Error E7

Read out example HYDRUS radio 868 OMS with the following telegram content (hexadecimal values):

Header, radio telegram counter, total volume, due date, flow rate, remaining battery lifetime, medium temperature °C, periodical log 1 date/time, periodical log 1 total volume

Legend:
Checksum -> After 16 bytes is always following a checksum, one byte is 2 bits (e.g. FF)
DIF value
VIF value
Value

Header:

FF F7 5D 40 73 4E 44	
A5 11	- Manufacturer-ID (it is determined from the manufacturer ID, e.g. DME)
81 86 98 53	- Serial number of the meter, always two-digit starting from the right -> 5398 8681
70	- Generation-ID (it is determined from the manufacturer ID, e.g. DME)
07	- Medium area (according to OMS standard: Cold water = 07, hot water= 22)
24 FA	- Checksum
7A	- CI-Field
B1	- Telegram counter (value is increased every 15 minutes when sending a telegram)
30	- Module State (M-Bus Status Byte)
40 05	- Encryption
2F 2F	- AES Verify

Data records:

01 FD 08 D9 - Telegram counter (value is always increased when sending a telegram)
0C 13 00 02 00 E5 31 00 - Total volume m³, 13 -> 3 DAC | 00 02 00 00-> 0.200 m³
7C 13 00 00 00 00 - Due date total volume, 4C when due date already exists | 13 -> 3 DAC
FC 10 13 00 00 00 00 - Due date reverse volume, CC 10 when due date already exists | 13 -> 3 DAC
FC 20 4F C5 13 00 00 00 00 - Due date forward volume, CC 20 when due date already exists | 13 ->3 DAC
72 6C 00 00 - Date of the due date (no date available), 42 when due date already exists
3B 3B DD BD EB - Flow rate -> 3B Flow rate in error status (no flow rate) | 0B at flow rate 3B -> 3 DAC | DD BD EB because currently no flow rate
02 FD 69 C2 74 CB 13 - Remaining battery lifetime
02 5A 0A 01 - Medium temperature °C
C4 01 6D 3B 17 1F 25 - Periodical log 1 date/time | F4 01 when no log entry yet
CC 01 90 E9 13 00 02 00 00 E8 EE DB BD - Periodical log 1 total volume, FC 01 when no log entry yet | 13 -> 3 DAC

The available DIF's and VIF's please see the communication description of the HYDRUS.

Contents

Cable M-Bus

M-Bus telegram according to M-Bus EN 13757

- Baud rate 300 or 2400 bauds
- Two-wire M-Bus cable with polarity reversal protection, 1.5 m long
- For communication with M-Bus receiver or IZAR CENTER
- No external power supply possible, power supply via internal battery
- Maximum data transmission of 100 bytes per minute possible

The application reset subcode 0 (0x00) for the wired M-Bus interface is factory-set. The following standard telegram is programmed:

1) Current volume (total)
2) Current reverse volume
3) Current forward volume
4) Current flow rate
5) Current operating hours
6) Current medium temperature °C
7) Current ambient temperature °C
8) Current date and time
9) Due date year (volume, return volume, forward volume, date)
10) Next due date

The telegram length of the standard telegram is about 95 bytes, so a maximum read-out interval of around 1 minute is possible. Shorter read-out intervals lead to an exceeding of the limit value of the logic capacitor.

HYDRUS has a separate logic capacitor for M-Bus communication. Error E5 is set if the limit of the capacitor is exceeded and deleted as soon as the capacitor drops below the limit again.

Method of operation of logic capacitor:
- Each byte received increments the logic capacitor by 1.
- Limit of logic capacitor: 65173 --> 65173 bytes can be received before the limit is reached.
- The logic capacitor is decremented by 100 every minute. -> Additional bytes can be received again.

An Application Reset 15 (0xF0) must be sent to the HYDRUS so that the meter answers with the customer telegram. The content of the wireless radio and wired M-Bus telegram is identical.

L-Bus

- L-Bus for connection to an external radio module
- Cable length 1.5 m

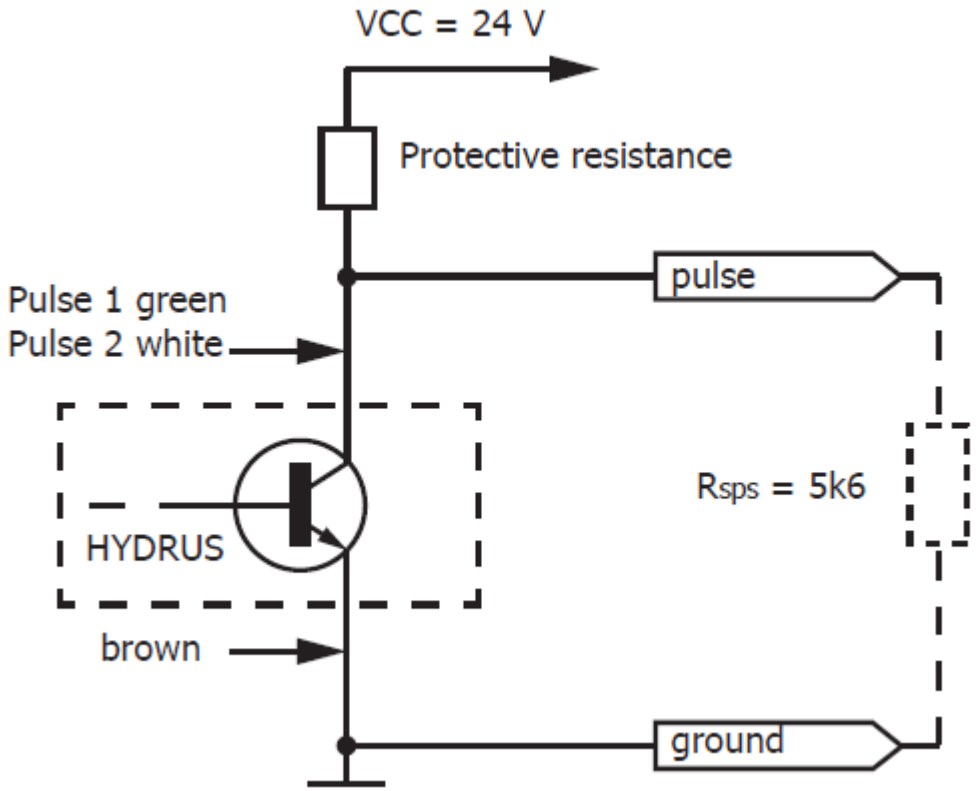
Pulse outputs

Cable pin assignment (M-Bus/L-Bus/pulse):

The M-Bus, L-Bus or pulse variant of the meter is supplied with a 1.5-m long, 3-wire cable with wire end ferrules.

Version/ colour	Pulse	L-Bus/pulse	M-Bus (2 wire)
white	Pulse 2	Pulse 2	M-Bus
brown	GND (ground)	GND (ground)	-
green	Pulse 1	L-Bus	M-Bus

Electrical isolation:
A voltage potential between the ground terminal of the L-Bus/pulse output and the meter housing ground (brass) must be avoided to prevent possible damage due to electrical corrosion.



The pulse outputs are open-collector circuits. The collector branch contains 0 ohm resistance, i.e. no current limiting takes place in the meter. This must be provided externally by a protective resistor. The internal resistance of the device should be 5 times the resistance of the protective resistor.

HYDRUS is equipped with two pulse outputs (open collector, pulse 1 and pulse 2), which can be configured differently (see below for ex works settings).

Pulse outputs and pulse rates, technical data:

Input voltage	max. 30 V
Input current	max. 27 mA
Voltage drop at the active output	max 2 V / 27 mA
Current through inactive output	max. 5 µA / 30 V
Reverse current	max. 27 mA
Pulse duration	depending on device configuration , see table below
Pulse break	depending on device configuration , see table below
Pulse frequency	depending on device configuration , see table below

Possible pulse variants:

Pulse 1: Total volume or forward volume
Pulse 2: Forward volume, error or direction
(When total volume on pulse output 1, only direction possible on pulse output 2)

It is possible to subsequently modify the pulse settings in the meter using the IZAR@MOBILE 2 software in conjunction with the expert dongle and a Bluetooth optohead.

Pulse settings:

Pulse output 1 can FAST mode and SLOW Mode pulses (automatically change to SLOW Mode from 10 liter)

Pulse output 2 can only SLOW Mode pulses (with fixed pulse duration of 125 ms)

In FAST Mode, the pulse outputs are with the following pulse values: 0,1L/Pulse and 1L/Pulse (Thus, with 0,1L and 1L always FAST MODE on pulse output 1)

In SLOW Mode, the pulse outputs are with the following pulse values: 1L/Pulse (Only pulse output 2),10L/Pulse; 100L/Pulse and 1000L/Pulse)

Table view Pulse Output 1:

Nominal Diameter	Qnenn	Qmax	Pulse in [l/Pulse] decadic				
			Fast Mode 50 ms		Slow Mode 125 ms		
DN	Q3 in [m³/h]	Q4 in [m³/h]	0,1	1	10	100	1000
15/20	1,6	2					
15/20	2,5	3,13					
20	4	5					
25/32	6,3	7,88					
25/32/40	10	12,5					
40/50	16	20					
50	25	31,25					
			Meaning:	**Pulse configuration ok**		**Pulse configuration not ok**	

	Calculation Slow Mode:				
Pulse duration =	125	ms			
Pulse break =	125	ms			
Pulse length =	250	ms	Frequency 4 Hz		

	Calculation Fast Mode:				
Pulse duration =	50	ms			
Pulse break =	50	ms			
Pulse length =	100	ms	Frequency 10 Hz		

Table view Pulse Output 2:

Nominal Diameter	Qnenn	Qmax	Pulse in [l/Pulse] decadic			
			Slow Mode 125 ms			
DN	Q3 in [m³/h]	Q4 in [m³/h]	1	10	100	1000
15/20	1,6	2				
15/20	2,5	3,13				
20	4	5				
25/32	6,3	7,88				
25/32/40	10	12,5				
40/50	16	20				
50	25	31,25				
			Meaning:	**Pulse configuration ok**		**Pulse configuration not ok**

	Calculation Slow Mode:				
Pulse duration =	125	ms			
Pulse break =	125	ms			
Pulse length =	250	ms	Frequency 4	Hz	

For information:

With pulse setting "Slow Mode" on both pulse outputs, only the same pulse values can be chosen.

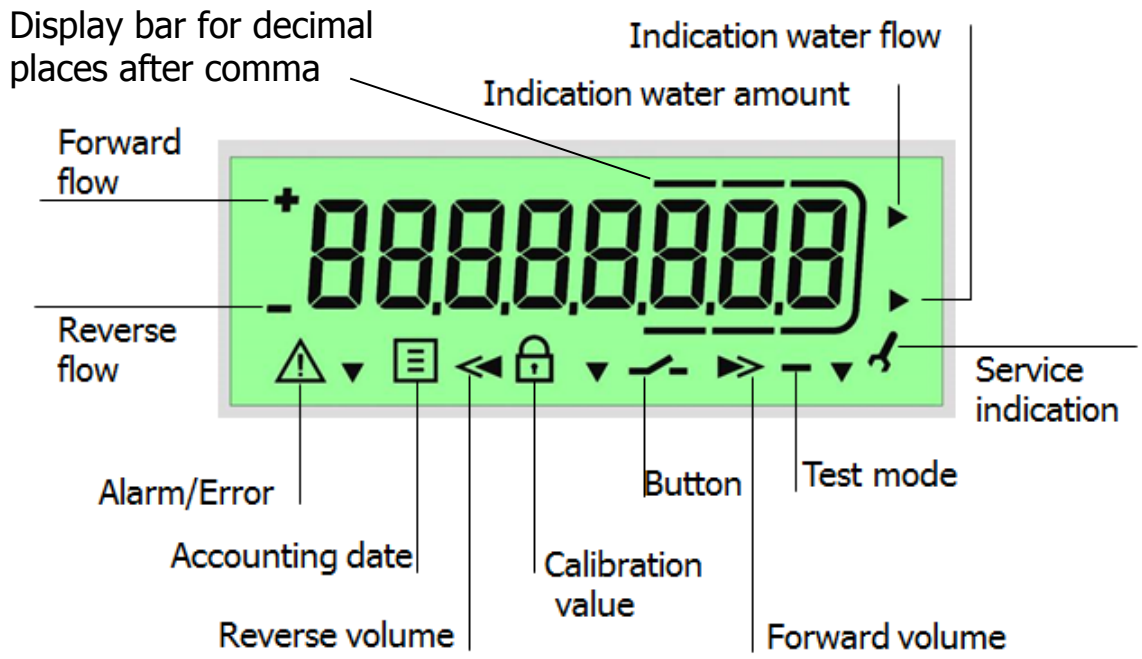
8. Programming / configuration

Note: A detailed description of the communication interfaces can be found in a separate Communication Description on our home page
http://www.diehl.com/de/diehl-metering.html

8.1 LC display

Meter information can be called up on the 8-digit LC display. The display information is arranged in a display loop in several display windows. The various display windows and display windows with automatic display changes are illustrated below. A list of the possible display information can also be found in the Communication Description.
The display windows can be changed by pressing the optical button. Each press of the button changes to the start display of the next display window.
To save the battery, the meter switches to sleep mode if the button is not pressed for approx. 4 minutes (see also section "Optical button").
When HYDRUS is taken into operation for the first time it can take up to 2 minutes before the first updated display appears; after this the display is updated every 5 seconds.
The display changes automatically to the basic display if the button is not pressed for approx. 4 minutes.
If the meter detects Error E1, E4 or E7, it is always shown the Error-/Alarm loop as basis display.

Display symbols:



8.2 Display loop – selection by customer

Two different display loops are available for selection ex works. It is possible to subsequently modify the LCD contents and sequence in the meter using the IZAR@MOBILE 2 software in conjunction with the expert dongle and a Bluetooth optohead.

☐ **Display loop 1**

Sequence	Window 1		Window 2
1	123456 Current total volume		
2	88888888 Display test - all on	2s	Display test - all off
3	E-7-A--7 Error messages (if error exists, e.g. "E - 7 - A- - -")		
4	123456. Flow rate (m³/h)	or	Err Displays "Err" in not installed condition
5	31 12 13 Due date	2s	123456 Total volume of the due date
6	123456 Current reverse volume		
7	F06-006 Software version	4s	C 7194 Software checksum
8	bAtt Battery lifetime „batt"	2s	26.04.28 Battery lifetime date
9			

☐ **Display loop 2**

Window 1		Window 2
123456 Current total volume		
88888888 Display test - all on	2s	Display test - all off
E-7-A--7 Error messages (if error exists, e.g. "E - 7 - A- - -")		
123456. Flow rate (m³/h)	or	Err Displays "Err" in not installed condition
31 12 13 Due date	2s	123456 Total volume of the due date
123456 Current reverse volume		
F06-006 Software version	4s	C 7194 Software checksum
bAtt Battery lifetime „batt"	2s	26.04.28 Battery lifetime date
020 1428 Volume (high resolution)		

DIEHL
Metering

8.3 Radio / M-Bus telegram – selection by customer

Three different telegrams are available for selection ex works. It is possible to subsequently modify the telegram contents and the sequence of values in the meter using the IZAR@MOBILE 2 software in conjunction with the expert dongle and a Bluetooth optohead.

	Telegram 1	Telegram 2	Telegram 3
1	Total volume	Total volume	Total volume
2	Due date year (Volume, reverse volume, forward volume, date)	Due date year (Volume, reverse volume, forward volume, date)	Due date year (Volume, reverse volume, forward volume, date)
3	Current flow rate	Current flow rate	Current flow rate
4	Battery lifetime	Battery lifetime	Battery lifetime
5	Water temperature in °C	Water temperature in °C	Water temperature in °C
6	Last month periodical log (Date/time)	Reverse volume	Reverse volume
7	Last month periodical log (Total volume)	Ambient temperature in °C	Error bits
8	Radio telegram counter	Radio telegram counter	Radio telegram counter

	Selection of radio / M-Bus telegram
☐	**Telegram 1**
☐	**Telegram 2**
☐	**Telegram 3**

Radio sending interval for MOBILE in OMS 3: Approximately all 12 seconds
Radio sending interval for MOBILE in OMS 4: Approximately all 14 seconds

Radio sending interfall for FIXED NETWORK in OMS 3/4: All 5 minutes

8.4 Radio OMS 3 or OMS 4 – selection by customer

Please see detailed description under Point 7. Communication / interfaces (**Wireless radio)**

	Selection of OMS3 (Profile A) or OMS 4 (Profile B)
☐	**OMS 3 (See Point 8.5)**
☐	**OMS 4**

➔ OMS 4 is only possible with individual key per meter.

8.5 AES encryption for OMS 3 – selection by customer

See also 7. Communication / interfaces – Radio. The Diehl Metering AES key for OMS is set ex works. Individual customer-specific key for OMS can be set in the customer's variant if required. We will also be pleased to create a key for you.

Please note that only the first **6 digits** can be individually arranged numerically. An individual key is not possible for the protocol type Real Data.

Also possible is an individual key per meter which is assigned automatically in our production with a secure algorithm for each meter. This **must** be specified when the order is placed.

You can enter your requirements under **13. Further specifications/customer remarks**.

8.6 Error and alarms

HYDRUS can detect the following errors and alarms, show them in the display and transmit them by communication:

Errors (current status):

C 1: Electronic error, the meter must be replaced.
E 1: Medium temperature too low or too high (< - 30 °C / > 100 °C), or cable temperature sensor disconnected or cut off
E 4: Ultrasonic hardware error, ultrasonic transducer defective or short-circuit, or cable ultrasonic transducers disconnected or cut off
E 5: Communication not possible (too frequent reading over M-Bus or optical interface)
E 7: Air in supply system, flow rate measurement not possible

Errors are shown in the display as long as they exist.

Alarms:

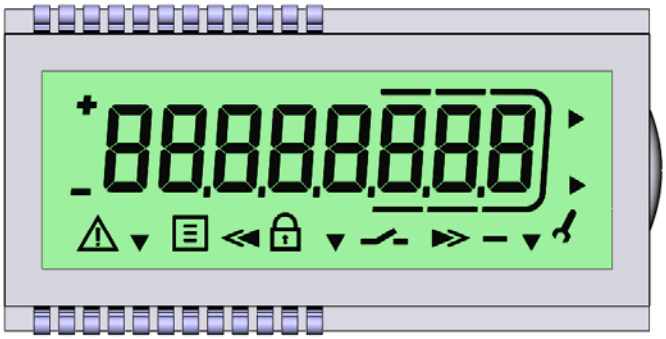
A 1: Reverse flow
A 3: No usage (over a certain period, configurable)
A 4: Failure of ultrasonic or temperature measuring
A 5: Leakage (configurable to user profile)
A 6: Low medium temperature (< 3 °C) + Error E4
A 7: Air in pipe system
A 9: Battery too low

The meter must detect an alarm/error for average 6 minutes, then there is an entry in the error log.

HYDRUS error/alarm mechanism:

HYDRUS modes	Errors	Alarms	Radio	Measuring interval
Storage mode	on	off	off	1/60 Hz (1 minute)
↓ When water is detected ↑ When water is detected less than 3 hours				
Field mode	on	off	on	0,5 Hz (2 seconds)
↓ After detection of water for 3 hours without interruption				
Permanent Field mode	on	on	on	0,5 Hz (2 seconds)

Priority of the errors/alarms in the display (8-digits in the display):



	Errors				Alarms			
Digits	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8
Priority 1	E	1	4	5	A	1	5	4
Priority 2	E	-	7	-	A	-	3	9
Priority 3	E	-	-	-	A	-	-	6
Priority 4	E	-	-	-	A	-	-	7

Priorities are valid per digit, only the higher priority error/alarm is displayed (if they happens at the same time, e.g. E4 and E7, HYDRUS only display then E4)

If error "C1" appears, only this error will be shown then in the display (highest priority error):

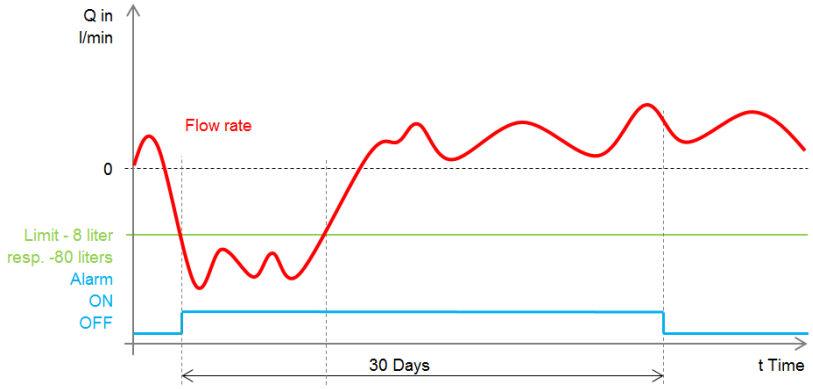
Digits	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8
	-	-	-	C	1	-	-	-

Description of alarms:

A1 Reverse flow
The meter checks whether the consumption was below the limit (-8l or -80l).
If so, the alarm is set. If the alarm has no longer occurred for 30* days, the alarm is reset.

For meter Q3 1.6 m³/h – 6.3 m³/h: Limit is (-8 liter)
For meter Q3 10 m³/h – 25 m³/h: Limit is (-80 liter)

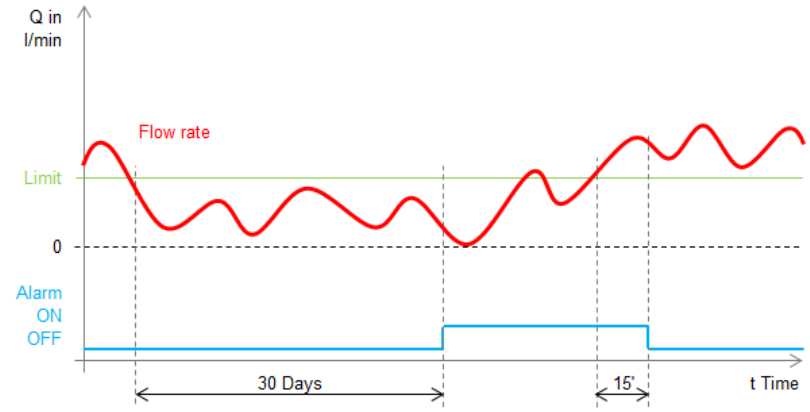
Alarm A1 Reverse volume



A3 No usage
The meter checks whether the 15-minute average consumption was less than the limit (8l or 80l, respectively -8l or -80l) in 30 consecutive days. The alarm is deactivated as soon as the 15-minute average consumption is greater than the limit.

For meter Q3 1.6 m³/h – 6.3 m³/h: Limit is 8 liter
For meter Q3 10 m³/h – 25 m³/h: Limit is 80 liter

Alarm A3 No usage

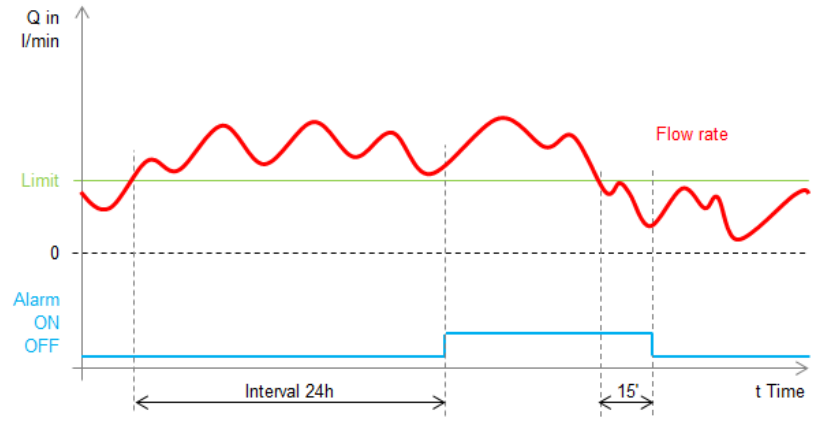


A4 Failure of ultrasonic or temperature measuring
The meter reports an alarm if an error E4 and error TMH (Hardware error temperature measurement) was active in 8 consecutive minutes.
The alarm is reset after 30* days.

A5 Leakage
The meter checks whether the 15-minute average consumption was always above the limit (0.8l or 8 respectively -0.8l or -8l) in 24 consecutive hours. The alarm is only activated if the limit was always exceeded in the 24 hours (otherwise the meter starts the 24-hour calculation from the beginning).
The alarm is reset 15 minutes after the leakage is cleared.

For meter Q3 1.6 m³/h – 6.3 m³/h: Limit is 0.8 liter
For meter Q3 10 m³/h – 25 m³/h: Limit is 8 liter

Alarm A5 Leakage



Example: In a 1-family house there is to be no flow for 15 min. once in 24 hours, otherwise a leakage may exist. The time window (15 min.) can be selected as desired or set ex works and the limit ("zero flow rate") can also be defined. This means, for example, that the minimum flow rate can be specified as the limit in a factory in which water is generally drawn around the clock.

A6 Low temperature (below 3 °C)
The alarm is activated if the temperature is less than 3 °C after 4 consecutive temperature measurements (every 16 seconds) and the meter detects Error E4 at the same time. The alarm is reset after 30* days.

A7 Air in pipe system, no flow rate measurement
The meter reports the alarm A7 if Error E7 (Air in the measuring path) is active.
The alarm is deactivated after 30* days without air.

A9 Battery too low
If calculated battery life is less than 400 days.
The alarm is deactivated when the calculated battery life is greater than 400 days.

* The alarm hold time is 30 days ex works. Existing alarms are shown in the display for 30 days. If the alarm is no longer present within this time, it will no longer be displayed after these 30 days. Exceptions are alarms A3, A5 and A9.

All errors and alarms occurring are saved with their date and time in the error log.
In the ex works state the leakage interval is set to 24 hours and all alarms are activated.

It is possible to subsequently modify the alarm holding time, the leakage interval and the activated alarms in the meter using the IZAR@MOBILE 2 software in conjunction with the expert dongle and a Bluetooth optohead.

Alarm holding time:
30 days

Leakage interval:
24 hours

Activated alarms:
Alarm A1 - Reverse flow
Alarm A3 - No usage
Alarm A4 - Failure of ultrasonic or temperature measuring
Alarm A5 - Leakage
Alarm A6 - Low temperature (below 3 °C)
Alarm A7 - Air in the pipe, no volume measuring
Alarm A9 - Battery too low

8.7 Minimum / maximum flow rate

HYDRUS calculates every 15 minute a minimum or maximum flow. The monitoring period is one month. If a new minimum or maximum value is reached in this period, the new value is stored.
It is possible to read out the values using the IZAR@MOBILE 2 software in conjunction with a Bluetooth optohead.

At the end of the month the minimum or flow maximum of this monitoring period is transferred in the periodical log and the values will be reset at the same time. It starts again a new monitoring period. Thus in the periodical log is always stored the minimum or maximum flow of the last monitoring period (last month).

8.8 Periodical log 1

The periodical log saves 32 hourly, daily, weekly or monthly entries. The data log is set ex works for saving **data monthly**. The data shown below are logged at 23:59 at the end of each month. The data log can be read out over the optical interface using IZAR@MOBILE 2 software in conjunction with the Bluetooth optohead.

Note:
The periodical log is a ring memory and has only a limited space available. If the space is occupied, the oldest entry is overwritten with the newest entry in each case (FiFo). Thus at least 32 entries are always available.

The periodical log table shown in the IZAR@MOBILE 2 software can be exported as a .csv file and processed in MS Office Excel.

The following data are saved:

	Periodical log
1	Current date and time
2	Total volume
3	Flow rate
4	Forward volume
5	Reverse volume
6	Minimum flow
7	Maximum flow
8	Medium temperature
9	Ambient temperature
10	Error time
11	On time
12	Status

Description of the values:

1. Current date and time:

The date and time at the time of entry in the periodical log.

2. Total volume:

Total volume at the time of entry in the periodical log.

3. Flow rate:

Current flow rate at the time of entry in the periodical log.

4. Forward volume:

Total detected forward volume at the time of entry in the periodical log.

5. Reverse volume:

Total detected reverse volume at the time of entry in the periodical log.

6. / 7. Minimum / Maximum flow:

The minimum/maximum flow rate will be logged once per month in the periodical log.
The minimum or maximum flow value of the last monitoring period (last month) is always stored, see description "8.7. Minimum / maximum flow rate".

8. Medium temperature:

Medium temperature at the time of entry in the periodical log.

9. Ambient temperature:

Ambient temperature at the time of entry in the periodical log.

10. Error time:

The error time specify how many hours the meter ever detects Error 1E1 and/or E4. The error time are thus summed up monthly.

11. On time:

On time specify since how many hours the meter is in the field mode. The hours are thus summed up monthly.

11. Status:

In the field "Status" the central error- and alarm register will be emitted at the time of entry in the periodical log, e.g. E7 (Air in the pipe).

8.9 Periodical log 2 (Daily log)

The already existing data store for 32 hours, days, weeks or monthly values is expanded with the new additional data memory for a further 1024 daily values.

At the end of every day HYDRUS logs the following data for 1024 days:

Current Date and time, Total volume, Forward volume, Medium temperature °C, Ambient temperature °C, Status

The new data memory is a so-called ring memory; this means after 1024 entries, the oldest value is replaced by the newest value (first in - first out).

The ring memory provides **daily values** and cannot be configured.

The memory can read via the optical interface using the Bluetooth Optohead and the IZAR@MOBILE 2 from Version 2.4.4.

Description of the values:

1. Current date and time:

The date and time at the time of entry in the daily log.

2. Total volume:

Total volume at the time of entry in the daily log.

3. Forward volume:

Total detected volume at the time of entry in the daily log.

4. Medium temperature °C:

Medium temperature °C at the time of entry in the daily log.

5. Ambient temperature °C:

Ambient temperature °C at the time of entry in the daily log.

6. Status

In the field "Status" the central error- and alarm register will be emitted at the time of entry in the daily log, e.g. E7 (Air in the pipe).

8.10 Error log (historical log)

Errors and alarms are saved in the error log with their date and time. The error log can store up to 127 x 4-byte values and can also be read out over the optical interface using IZAR@MOBILE 2 software and a Bluetooth optohead.

Errors/alarms are shown in the log with a 0 or 1 flag. 0 = error/alarm not occurred and 1 = error/alarm occurred. If an error/alarm is no longer existing, HYDRUS sets also an entry with 0 for this error/alarm.

Note:
All errors/alarms are logged, even if several should be present at the same time.

Errors/Alarms are only stored and displayed if they have been registered without interruption for an average of 6 minutes.

The error log is full after 127 entries and no further entry can be saved. It is no ring memory.

The error log table shown in the IZAR@MOBILE 2 software can be exported as a .csv file and processed in MS Office Excel.

Until the 100th entry the status changes of the following errors / alarms are logged:

- Low medium temperature (Alarm A6)
- No usage (Alarm A3)
- Reverse flow (Alarm A1)
- Error in the ultrasonic system (Alarm A4)
- Leakage (Alarm A5)
- Error in the ultrasonic system (Error E4)
- Temperature sensors defect (Error TMH)
- Medium temperature too high or too low (Error E1)
- Air in the pipe (Error E7)
- Eletronic error (Error C1) (immediately logging when occurs)
- Reset of the meter (immediately logging when occurs)
- Protection level change (immediately logging when occurs)

From the 100th entry the status changes of the following errors / alarms are only logged:

- Error in the ultrasonic system (Error E4)
- Temperature sensors defect (Fehler TMH)
- Medium temperature too high or too low (Error E1)
- Eletronic error (Error C1) (immediately logging when occurs)
- Reset of the meter (immediately logging when occurs)
- Protection level change (immediately logging when occurs)

The following Errors/Alarms will stored up to a maximum of 15 times in the error log. Starting with the 16th entry, only the date is updated but it remains at 15 entries:

Error E7, Alarm A1, Alarm A3, Alarm A5, Alarm A6

9. Components / accessories

Seal for housing with thread connection:

DN 15 | connection G3/4B: material number 520408 (2 pieces)
DN 20 | connection G1B: material number 580341 (2 pieces)
DN 20 | connection G5/4B: material number 3011018 (2 pieces)
DN 25 | connection G5/4B: material number 3011018 (2 pieces)
DN 32 | connection G3/2B: material number 580142 (2 pieces)
DN 40 | connection G2B: material number 580343 (2 pieces)
DN 50 | connection G5/2B: material number 580408 (2 pieces)

Seal for housing with flange connection:

DN 25/32: Material number 580120 (2 pieces)
DN 40: Material number 580121 (2 pieces)
DN 50: material number 580114 (2 pieces)

Non-return valve:

Article number	Nominal diameter	Overall length	Included
3002044	15 mm	110 mm	Non-return valve 3002044
3017441	15 mm	165 mm 170 mm	Non-return valve 809186 + O-Ring 580422
3065660	20 mm	130 mm	Non-return valve 3065599 + O-Ring 3065602
3017442	20 mm	190 mm 220 mm	Non-return valve 809184 + O-Ring 3002823
3024137	25 mm	175 mm	Non-return valve 809185 + O-Ring 580315 + Compensating adapter 3011755
3024137	25 mm	260 mm	Non-return valve 809185 + O-Ring 580315 + Compensating adapter 3011755
3037565	32 mm	260 mm	Non-return valve 3049923 + O-Ring 3004189 + Compensating adapter 3050085
3063515	40 mm	300 mm	Non-return valve 809188 + O-Ring 580348

For DN 20 | overall length 110 mm | G1B, non-return valve not possible
For DN 25 | overall length 135 mm | G5/4B, non-return valve not possible
For DN 25 | overall length 150 mm | G5/4B, non-return valve not possible
For DN 40 | overall length 200 mm | G2B, non-return valve not possible
For DN 40 | overall length 300 mm | flange coupling, non-return valve not possible
For DN 50 non-return valve not possible

10. Spare parts

Cover of UV-resistant ASA plastic Material number 3000820

11. Package dimensions / weights

Permanent flow rate	Q3	m³/h	1,6	1,6	1,6	1,6	1,6	2,5	2,5
Nominal Diameter	DN	mm	15	15	15	20	20	15	15
Overall length	L	mm	110	165	170	130	190	110	165
Weight thread meter without coupling		kg	0,8	1	1	0,9	1,1	0,8	1
Weight thread meter with coupling		kg	1	1,4	1,4	1,3	1,5	1	1,4
Weight flange meter		kg	-	-	-	-	-	-	-
Dimension carton	L x W x H	mm				221 x 140 x 107			
Weight of the carton incl. Inserts		g	105	105	105	105	105	105	105
Lot size		pcs.	15	15	15	15	15	15	15
Number of meters per pallet		pcs.	225	225	225	225	225	225	225

Permanent flow rate	Q3	m³/h	2,5	2,5	2,5	4	4	4	4
Nominal Diameter	DN	mm	15	20	20	20	20	20	20
Overall length	L	mm	170	130	190	110	130	175	190
Weight thread meter without coupling		kg	1	0,9	1,1	0,9	0,9	1,1	1,1
Weight thread meter with coupling		kg	1,4	1,3	1,5	1,3	1,3	1,7	1,5
Weight flange meter		kg	-	-	-	-	-	-	-
Dimension carton	L x W x H	mm				221 x 140 x 107			
Weight of the carton incl. Inserts		g	105	105	105	105	105	105	105
Lot size		St.	15	15	15	15	15	13	15
Number of meters per pallet		St.	225	225	225	225	225	225	225

Permanent flow rate	Q3	m³/h	6.3	6.3	6,3	6,3	6,3	10	10
Nominal Diameter	DN	mm	25	25	25	25	32	25	25
Overall length	L	mm	135	150	175	260	260	135	150
Weight thread meter without coupling		kg	1,17	1,24	1,29	1,6	1,8	1,17	1,24
Weight thread meter with coupling		kg	1,77	1,84	1,89	2,2	2,4	1,77	1,84
Weight flange meter		kg	-	-	-	3,45	4,7		
Dimension carton	L x B x H	mm		221 x 140 x 107		262 x 127 x163		221 x 140 x 107	
Weight of the carton incl. Inserts		g	105	105	105	50	50	105	105
Lot size		St.	15	15	13	9	9	15	15
Number of meters per pallet		St.	225	225	225	144	144	225	225

Permanent flow rate	Q3	m³/h	10	10	10	10	10	16	
Nominal Diameter	DN	mm	25	25	32	40	40	40	
Overall length	L	mm	175	260	260	200	300	200	
Weight thread meter without coupling		kg	1,29	1,6	1,8	2,4	3,05	2,42	
Weight thread meter with coupling		kg	1,89	2,2	2,4	3,6	4,25	3,62	
Weight flange meter		kg	-	3,45	4,7	-	6,67	-	
Dimension carton	L x B x H	mm	221 x 140 x 107	262 x 127 x163		235 x 170 x 160	300 x 180 x 280	235 x 170 x 160	
Weight of the carton incl. Inserts		g	105	50	50	370	800	370	
Lot size		St.	14	9	9	5	5	5	
Number of meters per pallet		St.	225	144	144	70	70	70	

Permanent flow rate	Q3	m³/h	16	16	16	25	25		
Nominal Diameter	DN	mm	40	50	50	50	50		
Overall length	L	mm	300	270	300	270	300		
Weight thread meter without coupling		kg	3,05	3,9	-	3,9	-		
Weight thread meter with coupling		kg	4,25	5,5	-	5,5	-		
Weight flange meter		kg	6,67	7,23	7,47	7,23	7,47		
Dimension carton	L x B x H	mm			300 x 180 x 280				
Weight of the carton incl. Inserts		g	800	870	800	870	800		
Lot size		St.	5	5	4	5	4		
Number of meters per pallet		St.	70	70	70	70	70		

12. HYDRUS documentation

The following additional documents are valid in conjunction with the product specification and can be found on our home page at www.diehl.com/metering

- Data Sheet
- Installation and User Guide
- Configuration Sheet
- Communication Description
- IZAR@MOBILE 2 Manual (Can be requested from Diehl Metering if required)
- User Guide for Remote Control
- Inspection and Test Instruction

13. Further specifications / customer remarks

14. Release Product Specification

1. Planned pieces per year:

_ _

2. Release Product Specification and release of a sample* (by customer):

☐	**Release by sample necessary**
☐	**Release, no sample necessary**

_ _

Date, signature

*** The new created variant is always checked internally by a sample**