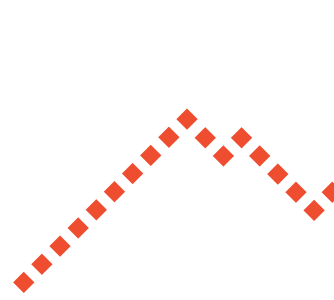


SHIPBUILDING

PRESSURE & TEMPERATURE MONITORING SOLUTIONS





RAUHE BEDINGUNGEN AUF HOHER SEE

Trafag verfügt über mehrere Jahrzehnte Erfahrung in Entwicklung, Herstellung und Einsatz von Schiffbauprodukten in den Bereichen Druck- und Temperaturmessung. Wir übertragen die steigenden Ansprüche der Schiffbauindustrie an Sicherheit und Zuverlässigkeit laufend auf unsere Produkte. Wir kombinieren die Produkterfordernisse der Klassifikationsgesellschaften mit rigorosem Qualitätsmanagement in Entwicklung und Produktion. Die Liegezeiten von Schiffen sind kurz, und Ersatzteile müssen rasch verfügbar sein. Trafag ist deshalb weltweit mit Niederlassungen und Distributoren lokal einsatzbereit.



ROUGH CONDITIONS ON THE SEAS

Trafag draws from decades of experience in the design, manufacture and application of pressure and temperature measuring instruments for the maritime industry. We continuously meet the rising expectations of the shipbuilding industry in respect of safety and reliability of our products. We combine the product requirements of the classification authorities with rigorous quality management in development and manufacturing. Docking times of ships are short and spare parts need to be available immediately. Trafag is able to provide this service on the spot worldwide, through its branch offices and distributors.



PRODUKTE NACH MASS

Neben typischen Standardprodukten für die Schiffbau- und Zulieferindustrie fertigen wir kundenspezifische Produkte. Sie werden in höchstem Mass rauhen Anforderungen gerecht – sei dies bezüglich Vibrationsfestigkeit, Seewasserbeständigkeit, Mineralölbeständigkeit, EMV oder Schaltheufigkeit. Auch busfähige und selbstüberwachende Geräte gehören dazu. Wir geben Langzeitstabilität unserer Geräte höchste Priorität. Das erlaubt unseren Kunden problemlosen, unterhaltsfreien Betrieb.

TAYLOR-MADE PRODUCTS

Besides typical standard products we also manufacture customized products for the shipbuilding industry and its system suppliers. These are able to cope with harsh conditions to the highest degree – be it with respect to vibration, resistance to seawater or mineral oil, EMC or high switching frequency. Self-diagnostic as well a bus-capable sensors are also available. We give the highest priority to the long-term stability of our devices. This provides our customers with trouble-free and maintenance-free operation.



SWISS BASED QUALITY - WORLDWIDE REPRESENTED

TOCHTERFIRMEN SUBSIDIARIES

Austria
Czech Republic
France
Germany
Great Britain
India
Italy
Japan

TRAFAG JOINT VENTURES

Poland

VERTRETUNGEN REPRESENTATIONS

Australia
Belgium
Canada
China
Cyprus
Denmark
Finland
Greece
Iceland
India
Israel
Korea
Netherlands
New Zealand
Norway
Portugal
Russia
Singapore
South Africa
Spain
Sweden
Taiwan
Turkey
United Arab Emirates
USA

REFERENZEN REFERENCES

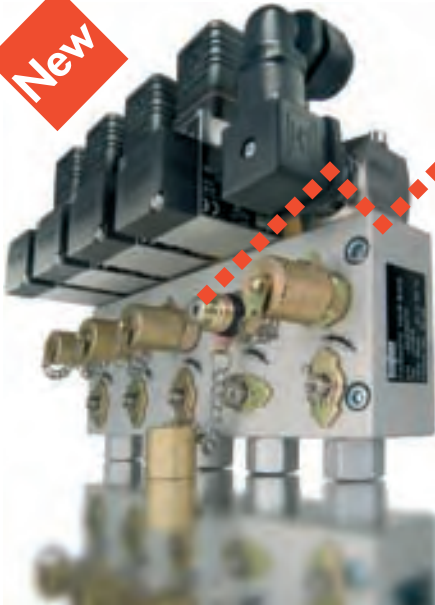
ABB
AIT
AKG
Alstom
Areva T&D
Atos
AVL
Benninghoven
Bharat Heavy Electrical
Blohm & Voss
Bombardier
Bosch Rexroth
BMW Rolls-Royce
Bühler
Caterpillar
Charmilles
Dalian Marine Diesel Ltd.
Detroit Diesel
Deutsche Bahn AG
Doosan Group
Dräger
Electrolux
Faiveley
Fincantieri
Flender
Gdansk Shipyard
Gdynia Shipyard
Goninan
Greenfield
G&W
Hermetic Pumpen
Roche
Hudong Shipyard
Hyundai Heavy Industries
IAV
Ingersoll Rand
Iveco
KOMA
MAN B&W
Melag
Mitsubishi
MTU

Noske-Kaeser
Oilon
Ormat Turbines
Parker
Philips
Petrochemia
Polarteknik PMC
Queensland Rail
Reintjes
Renk
Rolls-Royce
Schindler
Schneider Electric
Schottel
Sciteq-Hammel
Shanghai Shipyard
Siemens
SNCF
STX Heavy Industries
Szczecin Shipyard
Thermax Limited
Toshiba
Trumpf
Verolme Shipyard
Vesta
Viessmann
Voith
Wärtsilä
Westfalia Separator
W&H
Yichang Marine Diesel Ltd
York
ZF Marine

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trafag
sensors  controls

New



NEW REDESIGN: DIAGNOSTIC VALVE BLOCK DVB

Der DVB ist ein unverzichtbares Zubehör mit höchster Variabilität für die Prüfung, Regelung oder den Austausch von Druckmessgeräten in Hydraulik- und Pneumatik-Applikationen. Überall dort, wo höchste Flexibilität gefordert ist und der Arbeitsprozess nicht unterbrochen werden darf, findet der perfekt durchdachte DVB seinen Einsatz. Für Operationen am DVB während des drucklosen Zustands ist **kein Abschalten des Prozessablaufs** nötig.

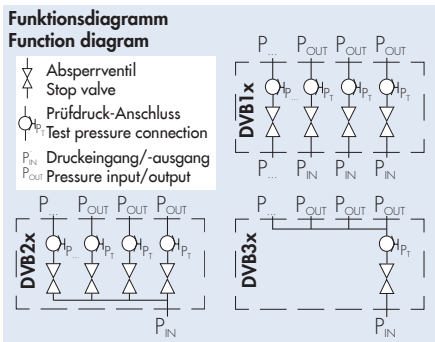
Haupteigenschaften:

- ◆ Funktionstests von Messgeräten während des Arbeitsprozesses mittels Absperrventil und Prüfdruckanschluss
- ◆ Druckeingang (P_{IN}): einzeln (Typ **DVB 1x**) oder gemeinsam (Typen **DVB2x** oder **DVB3x**)
- ◆ kompakte und leichte Bauweise
- ◆ einfache Bedienung
- ◆ kompatibel mit Trafag Picotrans Typ **NPN** und Picostat Typ **PSTK, PSTM, PST** und anderen

The DVB represents an indispensable, highly versatile accessory for the diagnostics, controlling or exchange of pressure measuring instruments in hydraulic and pneumatic applications. The well thought out DVB lends itself to all applications but in particular is most suitable wherever versatility is required and operation cannot be interrupted. Adjustments to the DVB in depressurised conditions **do not require an interruption of operation**.

Main features:

- ◆ Function tests of devices during the running process thanks to a stop valve and test pressure connection
- ◆ Pressure input (P_{IN}): single (Type **DVB 1x**) or common (Types **DVB2x** or **DVB3x**)
- ◆ compact and light construction
- ◆ fast and easy to operate
- ◆ compatible with Trafag Picotrans type **NPN**, Picostat type **PSTK, PSTM, PST** and others



i DATA SHEET NO: **H72361**
www.trafag.com/H72361

PRESSURE AND TEMPERATURE MONITORING SOLUTIONS

STEERING

Pressure monitoring of hydraulic oil.



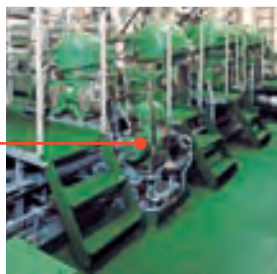
OIL PRE-HEATING

Monitoring of temperature control of fuel pre-heating.



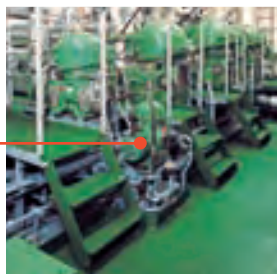
COMPRESSORS

Monitoring of inlet and delivery pressure prior to and after compression.



SEPARATORS

Treatment of mineral oils and their derivatives.



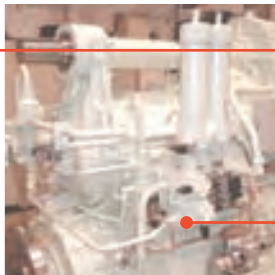
HYDRAULICS

Hydraulics on deck cranes, cargo, cylinders or line pressure.



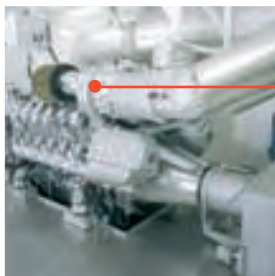
TRANSMISSION

Pressure and temperature monitoring of lubricant.



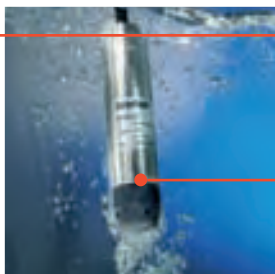
ENGINES

Monitoring of pressure and temperature of lubricants, fuel, intake air, air filter, cooling water or common rail injection.



PUMPS

Monitoring of pump pressure of various media also for explosive areas.



FILLING LEVEL

Level monitoring in ballast tanks or water ingress control systems.

ELECTRONIC PRESSURE TRANSMITTERS

STANDARD TYPE*	NAE...	NSL...	EPN...	NPN...	EPNCR...	ECON...A	CMP...	NAP...A EXNA...A	(Submersible) NAL...A EXNAL...A	DCS...AR	N...	ND...
DATA SHEET www.trafag.com/data-sheet	H72301	H72302	H72312	H72313	H72312	H72239	H72614	H72230 H72227	H72228 H72231	H72605	H72206	H72218
LEGENDE/ LÉGENDE/ LEGEND *andere Optionen siehe Datenblatt *other options see data sheet ()= non-standard options												
SENSOR TECHNOLOGY	Thin film on steel	Thin film on steel	Thin film on steel	Thin film on steel	Thin film on steel	Thick film on ceramic	Thin film on steel	Piezoresistive	Piezoresistive	Thin film on steel	Thin film on steel	Thin film on steel
MATERIAL SENSOR	DIN 1.4542 AISI 630	DIN 1.4542 AISI 630	DIN 1.4548 AISI 630	DIN 1.4548 AISI 630	DIN 1.4542 AISI 630	Ceramic (Al ₂ O ₃) O-Ring: FKM	DIN 1.4542 AISI 630	DIN 1.4435 AISI 316 L	DIN 1.4435 AISI 316 L	DIN 1.4542 AISI 630	DIN 1.4542 AISI 630	DIN 1.4542 AISI 630
MEASURING RANGE [bar]	min. 0 ... 2.5 max. 0 ... 600	min. 0 ... 0.2 max. 0 ... 2.5	min. 0 ... 2.5 max. 0 ... 600	min. 0 ... 2.5 max. 0 ... 400	min. 0 ... 1600 max. 0 ... 2500	min. 0 ... 1 max. 0 ... 250	min. 0 ... 4 max. 0 ... 600	min. 0 ... 0.1 max. 0 ... 600	min. 0 ... 0.1 max. 0 ... 25	min. 0 ... 2.5 max. 0 ... 600	min. 0 ... 0.6 max. 0 ... 600	min. 0 ... 0.4 max. 0 ... 16
OUTPUT ()= non-standard options	4...20 mA (0...10 VDC) (0.5...4.5 VDC)	4...20 mA (0...10, 0...5 VDC) (0.5...4.5 VDC)	4...20 mA (0.5...4.5 VDC)	4...20 mA	4...20 mA 0.5...4.5 VDC	4...20 mA	CANopen	4...20 mA (0...10V DC)	4...20 mA (0...10V DC)	4...20 mA Relays (Transistors)	4...20 mA	4...20 mA
SUPPLY VOLTAGE [VDC]	24	24	24	24	24	24 VAC/VDC	12/24	24	24	24	24	24
ACCURACY typ. (at 25°C) - Electronic Pressure Transmitters: NLH (BSL) % FS - Mechanical Pressure Switches: Switching differential [bar]	(± 0.1)/ ± 0.2	± 0.1	(± 0.1)/ ± 0.2	(± 0.1)/ ± 0.2	(± 0.1)/ ± 0.2	≤ 160 bar: ± 0.3 ≥ 160 bar: ± 0.5	(± 0.1)/ ± 0.2	(± 0.1)/ (± 0.25)/ ± 0.5	(± 0.1)/ (± 0.25)/ ± 0.5	± 0.2	± 0.2	± 0.5
OPERATING TEMPERATURE [°C]	-40 ... 125	-40 ... 125	-40 ... 125	-40 ... 100	-25 ... 100 (-40 ... 125)	-25 ... 85	-40 ... 85 (-40 ... 125)	0 ... 70	0 ... 70	-25 ... 80	-25 ... 85	-25 ... 85
MEDIA TEMPERATURE [°C]	-40 ... 125	-40 ... 125	-40 ... 125	-40 ... 100	-25 ... 100 (-40 ... 125)	≤ 60 bar: -25...85 ≥ 60 bar: -10...85	-50 ... 125 (-50 ... 135)	0 ... 80	0 ... 80	-25 ... 125	-25 ... 125	-25 ... 125
IP PROTECTION	IP65, 67	IP65, 67	IP65, 69K	IP65	IP65, 69K	IP65, 67	IP67	IP65, 67	IP68	IP65	IP65	IP65
ELECTRICAL CONNECTION ()= non-standard options	M12x1 (DIN43650 C193)	M12x1 (Industrial Standard)	DIN 43650 (DIN 72585) (Cable)	DIN 43650	DIN 43650 (DIN 72585) (Cable)	DIN 43650	M12x1	DIN 43650	Cable	M12x1	Terminal screw	Terminal screw
PRESSURE CONNECTION ()= non-standard options	G1/4" male (7/16"-20UNF male) (1/4" NPT male)	G1/4" male (1/4" NPT male)	G1/4" male (R1/4" male)	flange connection G1/4" female (G1/8", M10x1 female)	M14x1.5 male* M18x1.5 male* * with conical seal	G1/4" male/(female) (NPT 1/4" male)	G1/4" male (1/4" NPT male)	G1/4" male (G1/2" male)	with 4 inlets (G1/4" male)	G1/4" male/(female) (G1/2" male) (flange connection)	G1/4" female	2x G1/4" female
MATERIAL PRESSURE CONNECTION	DIN 1.4542/1.4301 AISI 630/304	DIN 1.4542/1.4301 AISI 630/304	DIN 1.4542/1.4301 AISI 630/304	DIN 1.4542/1.4301 AISI 630/304	DIN 1.4542/1.4301 AISI 630/304	DIN 1.4435 AISI 316L	DIN 1.4301 AISI 630	DIN 1.4435 AISI 316L	DIN 1.4435 AISI 316 L	DIN 1.4435 AISI 316 L	DIN 1.4435 AISI 316 L	DIN 1.4542 AISI 17-4 PH
SHIP APPROVALS ()= in preparation please consult us for further approvals	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK		ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS, (CCS)	(ABS), (BV), (DNV), (GL), (KRS), (LRS), (RINA), (NKK), (RMRS)	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK		GL	GL	GL	ABS, BV, DNV, GL, KRS, LRS, RINA	BV, DNV, KRS, RINA
SHIP BUILDING APPLICATIONS												
Getriebe/ Transmission	◆	◆	◆	◆	◇	◆	◆	◇	◇	◆	◆	◆
Ölvorwärmer/ Oil pre-heating	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◆	◆
Motoren/ Engines	◆	◆	◆	◆	◆	◆	◆	◇	◇	◇	◇	◆
Füllstand/ Filling level	◇	◆	◇	◇	◇	◇	◇	◆	◆	◇	◇	◇
Hydraulik/ Hydraulics	◆	◇	◆	◆	◇	◇	◆	◆	◇	◆	◇	◆
Separatoren/ Separators	◆	◇	◆	◆	◇	◆	◆	◇	◇	◇	◇	◇
Kompressoren/ Compressors	◆	◇	◆	◆	◇	◆	◆	◇	◇	◇	◇	◆
Pumpen/ Pumps	◆	◇	◆	◆	◆	◇	◆	◇	◇	◇	◇	◆
Rudermaschinen/ Rudder machines	◆	◇	◆	◆	◇	◇	◆	◇	◇	◆	◇	◇
Ex	◇	◇	◇	◇	◇	◇	◇	◆	◆	◇	◇	◇

	MECHANICAL PRESSURE SWITCHES								MECHANICAL THERMOSTATS			
STANDARD TYPE*	PSTK...4	PST...4 (PST3...4)	PSTM...4	PSTD...	PK... EXPK...	PV... PVF...	P... PS... EXP...	PD... EXPD...	STANDARD TYPE*	ISP... ISPT...	ISN... ISNT...	EXS...
DATA SHEET www.trafag.com/data-sheet	H72202	H72202 (H72209)	H72202	H72273	H72259 H72270	H72257	H72252 H72263	H72253 H72256	DATA SHEET www.trafag.com/data-sheet	H72113	H72111	H72108
LEGENDE/ LÉGENDE/ LEGEND *andere Optionen siehe Datenblatt *other options see data sheet ()= non-standard options									LEGENDE/ LÉGENDE/ LEGEND *andere Optionen siehe Datenblatt *other options see data sheet			
SENSOR TECHNOLOGY	Piston	Bellows	Membrane	Bellows (Different. pressure)	Piston	Bellows	Bellows	Bellows (Different. pressure)	SENSOR TECHNOLOGY	Capillary tube	Capillary tube	Capillary tube
MATERIAL SENSOR	DIN 1.4435 (AISI 316 L) PTFE-Sealing	Bronze CuZn6 (stainless steel)	FKM	Bronze CuZn6	DIN 1.4435 AISI 316L	Bronze CuZn6	Bronze CuZn6	Bronze CuZn6	MATERIAL SENSOR ()= non-standard options	Cu nickel plated	Cu nickel plated (DIN 1.4435/AISI 316 L)	Cu nickel plated (DIN 1.4435/AISI 316 L)
MEASURING RANGE [bar]	min. 1 ... 10 max. 40 ... 400	min. -0.6 ... 3.4 max. 4 ... 40	min. 1 ... 10 max. 10 ... 100	min. -1 ... 6 max. -1 ... 8	min. 1 ... 10 max. 60 ... 600	min. -0.9 ... 1.5 max. 4 ... 40	min. -0.9 ... 1.5 max. 4 ... 100	min. -0.6 ... 3.4 max. 1 ... 16	MEASURING RANGE [°C]	min. 5 ... 95 max. 40 ... 300	min. 20 ... 110 max. 40 ... 300	min. -30 ... 40 max. 70 ... 350
OUTPUT ()= non-standard options	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)	OUTPUT	microswitch (on/off)	microswitch (on/off)	microswitch (on/off)
SUPPLY VOLTAGE [VDC]	-	-	-	-	-	-	-	-	-	-	-	-
ACCURACY typ. (at 25°C) - Electronic Pressure Transmitters: NLH (BSI) % FS - Mechanical Pressure Switches: Switching differential [bar]	min. 0.8 ... 2.4 max. 15 ... 50	min. 0.3 max. 1.6	min. 0.4 ... 1.7 max. 4 ... 16	min. 0.2 max. 0.3	min. 0.45 ... 0.9 max. 8 ... 32	min. 0.1 ... 1.3 max. 3 ... 18 (adjustable)	min. 0.03 max. 1.5	min. 0.16 max. 0.4	ACCURACY typ. (at 25°C) - Mechanical Thermostats: Switching differential [°C] - Electronic Thermostats: Temperature [°C]	min. 4 max. 10	min. 2 max. 7	min. 2.5 max. 10
OPERATING TEMPERATURE [°C]	-25 ... 85	-25 ... 85	0 ... 80	-25 ... 85	-20 ... 70	-20 ... 70	-20 ... 70	-20 ... 70	OPERATING TEMPERATURE [°C]	-30 ... 70	-30 ... 70	min. -30 ... 50 max. -30 ... 65
MEDIA TEMPERATURE [°C]	-25 ... 120	-25 ... 120	0 ... 80	-25 ... 120	-30 ... 100	-40 ... 150	-40 ... 150	-40 ... 150	MEDIA TEMPERATURE [°C]	see "Measuring range"	see "Measuring range"	see "Measuring range"
IP PROTECTION	IP65	IP65	IP65	IP65	IP65	IP65	IP65	IP65	IP PROTECTION	IP65	IP65	IP65
ELECTRICAL CONNECTION ()= non-standard options	DIN 43650	DIN 43650	DIN 43650	DIN 43650	Terminal screw	Terminal screw	Terminal screw	Terminal screw	ELECTRICAL CONNECTION	Terminal screw	Terminal screw	Terminal screw
PRESSURE CONNECTION ()= non-standard options	G1/4" female flange connection (G1/8" female)	G1/4" female flange connection (G1/8" female)	G1/4" female flange connection (G1/8" female)	2xG1/4" female (flange connection)	G1/4" female	G1/4" female	G1/4" female	2x G1/8" female	CAPILLARY TUBE LENGTH [m]	ISP: 3 ISPT: Sensor on housing	ISN: 3 ISNT: Sensor on housing	2
MATERIAL PRESSURE CONNECTION	DIN 1.4404 AISI 316 L	Brass CuZn39Pb (DIN 1.4404/ AISI 316L)	Brass CuZn39Pb	Brass CuZn39Pb	DIN 1.4435 AISI 316 L	Brass CuZn39Pb	Brass CuZn39Pb	Brass CuZn39Pb	SUPPLY VOLTAGE [VDC]	-	-	-
SHIP APPROVALS ()= in preparation please consult us for further approvals	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS	GL	ABS, BV, DNV, GL, KRS, LRS, RINA, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, (CCS)	SHIP APPROVALS ()= in preparation please consult us for further approvals	ABS, BV, DNV, GL, KRS, LRS, RINA, NKK, RMRS, (CCS)	ABS, BV, DNV, GL, KRS, LRS, RINA, RMRS, (CCS)	
SHIP BUILDING APPLICATIONS									SHIP BUILDING APPLICATIONS			
Getriebe/ Transmission	◆	◆	◆	◆	◆	◆	◆	◆	Getriebe/ Transmission	◆	◆	◇
Ölvorwärmer/ Oil pre-heating	◇	◇	◇	◆	◆	◆	◆	◆	Ölvorwärmer/ Oil pre-heating	◆	◆	◇
Motoren/ Engines	◆	◆	◆	◆	◆	◆	◆	◆	Motoren/ Engines	◆	◆	◇
Füllstand/ Filling level	◇	◇	◇	◇	◇	◇	◇	◇	Füllstand/ Filling level	◇	◇	◇
Hydraulik/ Hydraulics	◆	◇	◇	◇	◆	◇	◇	◇	Hydraulik/ Hydraulics	◇	◇	◇
Separatoren/ Separators	◆	◆	◆	◆	◆	◆	◆	◆	Separatoren/ Separators	◇	◇	◇
Kompressoren/ Compressors	◆	◆	◆	◆	◆	◆	◆	◆	Kompressoren/ Compressors	◇	◇	◇
Pumpen/ Pumps	◆	◆	◆	◆	◆	◆	◆	◆	Pumpen/ Pumps	◇	◇	◇
Rudermaschinen/ Rudder machines	◆	◆	◆	◆	◆	◆	◆	◆	Rudermaschinen/ Rudder machines	◇	◇	◇
Ex	◇	◇	◇	◇	◆	◇	◆	◆	Ex	◇	◇	◆