



Fluid Monitoring Module FMM

Description

The FluidMonitoring Module FMM series combines two of Hydac's condition monitoring products, the ContaminationSensor CS 1000 and AquaSensor AS 1000, in one system.

It provides the user with a robust and stationary system for online measurement of

- particle contamination and
- water content (e.g. to detect leakage) in hydraulic and lubrication fluids.

The FMM series of blocks have all the necessary connections and are therefore easy to install in existing hydraulic circuits.

Various models are available for use in filtration & cooler/heater circuits, pressure and high pressure applications.

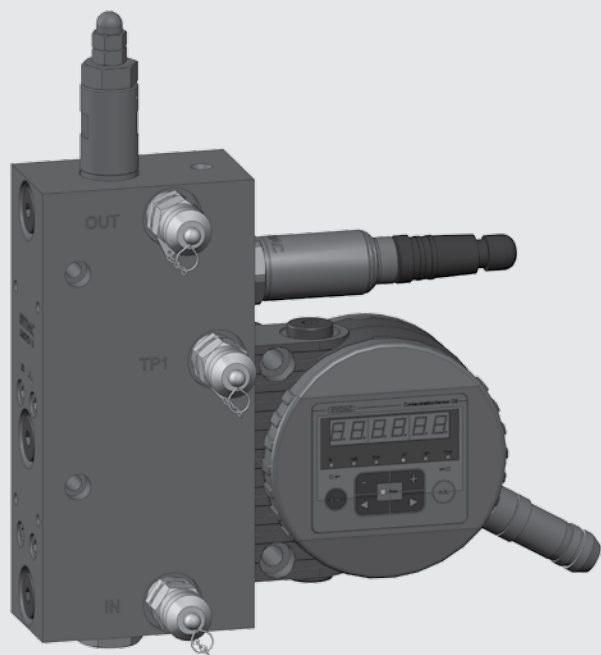
Advantages

- Cost-effective installation
- Critical machine conditions are identified in good time
- Continuous oil condition monitoring
- Condition-based maintenance planning

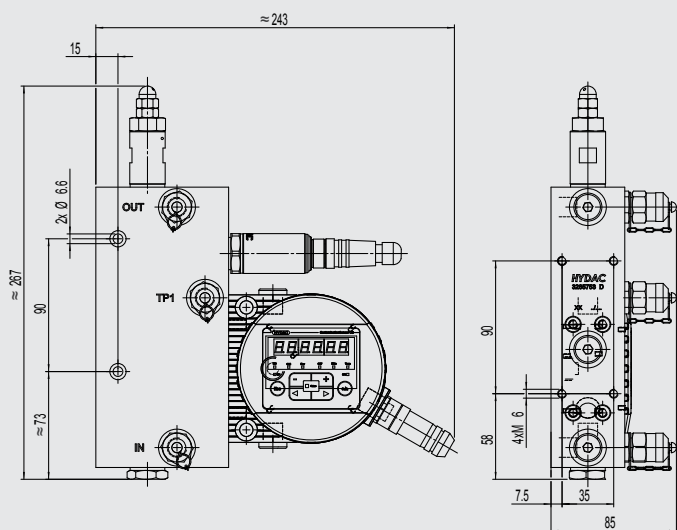
Technical specifications

General data	
FMM - O - M - ...	Offline circuits 6 ... 15 bar
FMM - P - S - ...	Pressure circuits 15 ... 350 bar
FMM - P - M - ...	Pressure circuits 15 ... 350 bar
FMM - P - L - ...	Pressure circuits 15 ... 250/350 bar
FMM - A - S - ...	Pressure circuits 15 ... 350 bar

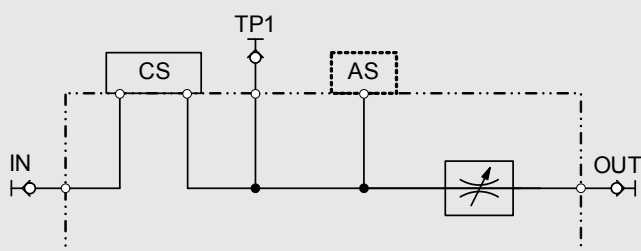
FMM - O - M - ... (previously known as: FMM)



Dimensions



Hydraulic circuit diagram



Technical specifications

Mounting position	vertical (flow from bottom to top)
Max. operating pressure	6 ... 15 bar / 87 ... 217 psi
Minimum differential pressure	6 bar / 87 psi (recommended)
Permitted viscosity range	1 ... 350 mm ² /s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Material of seal	FKM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	4.3 kg

Model code

See last page

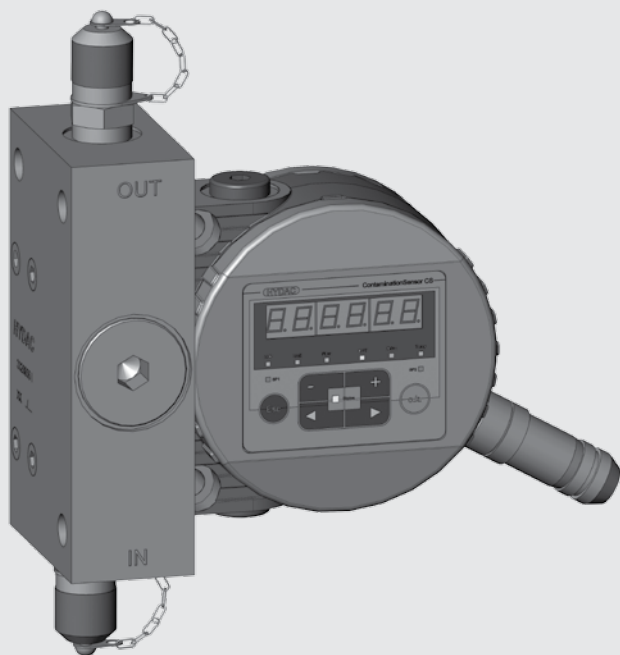
Items supplied

- 1 FMM - O - M - ...
- 1 Operating manual

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...), page 209 onwards.

FMM - P - S - ... (previously known as: FMMP)



Technical specifications

Mounting position	vertical (flow from bottom to top)
Max. operating pressure	15 ... 350 bar / 217 ... 5075 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm ² /s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Material of seal	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	4.3 kg

Model code

See last page

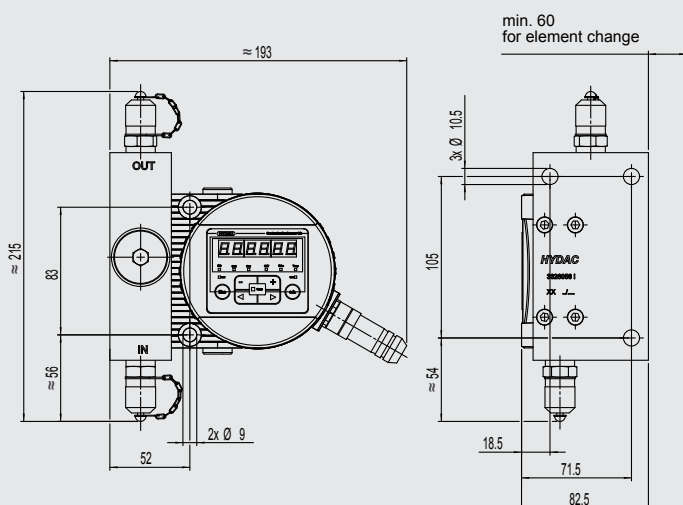
Items supplied

- 1 FMM - P - S - ...
- 1 Operating manual

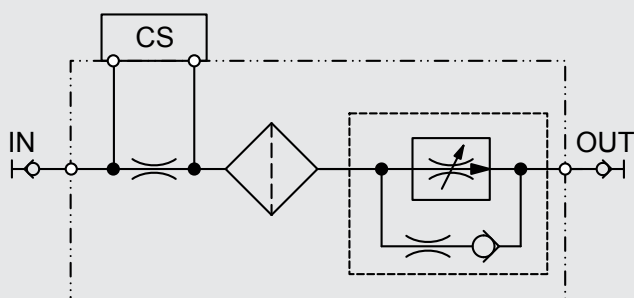
Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...), page 209 onwards.

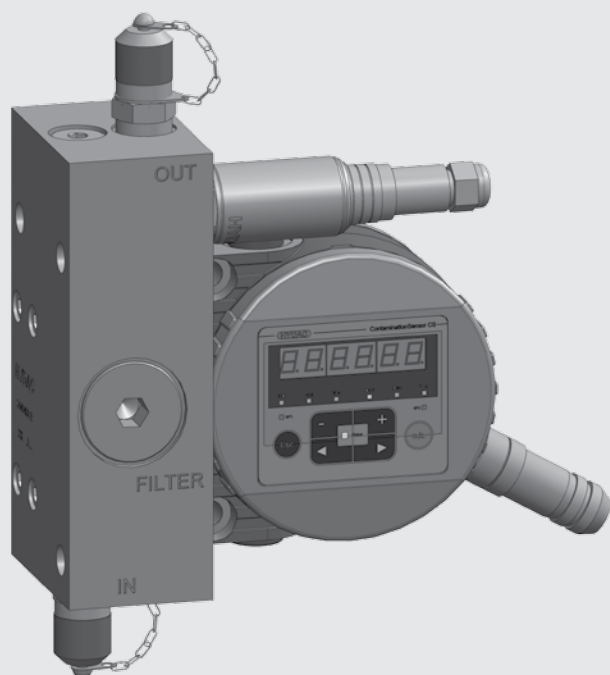
Dimensions



Hydraulic circuit diagram



FMM - P - M - ...



Technical specifications

Mounting position	vertical (flow from bottom to top)
Max. operating pressure	15 ... 350 bar / 217 ... 5075 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm ² /s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Material of seal	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	6.5 kg

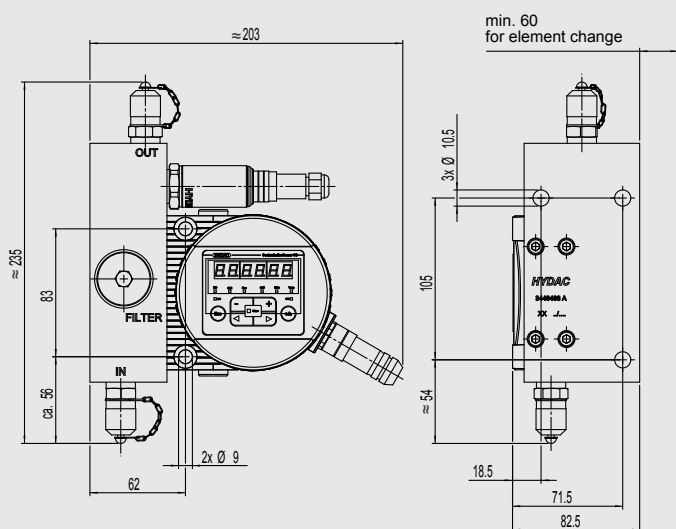
Model code

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Items supplied

- 1 FMM - P - M - ...
- 1 Operating manual

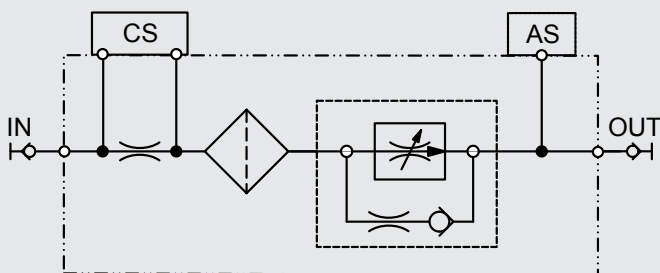
Dimensions



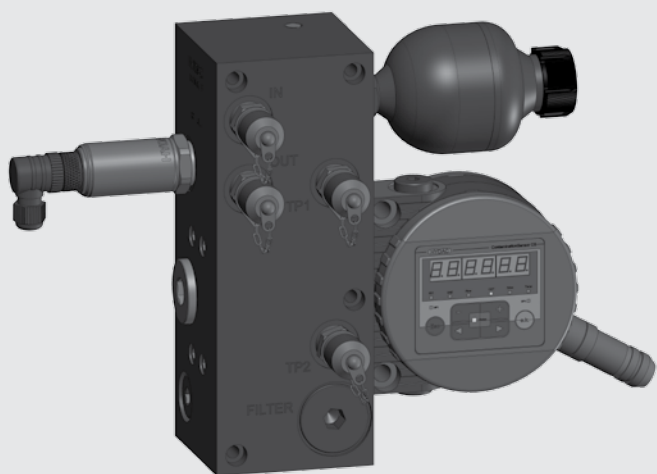
Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...), page 209 onwards.

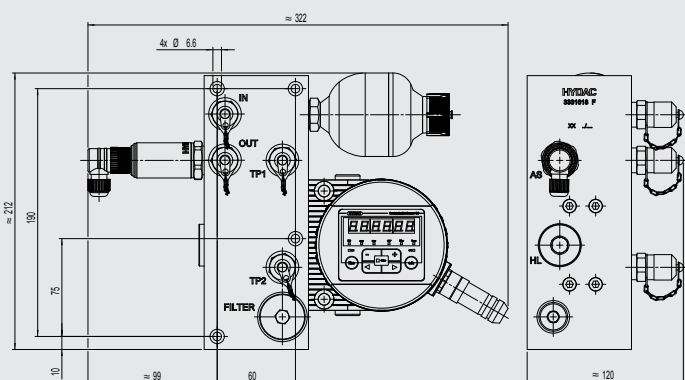
Hydraulic circuit diagram



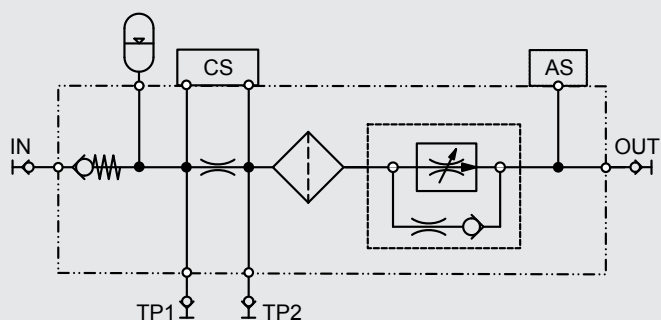
FMM - P - L - ... (previously known as: FMMHP)



Dimensions



Hydraulic circuit diagram



Technical specifications

Mounting position	vertical (flow from bottom to top)
Max. operating pressure without hydraulic accumulator	15 ... 350 bar / 217 ... 5075 psi
with hydraulic accumulator	15 ... 250 bar / 217 ... 3625 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm ² /s
Hydraulic connection (IN, OUT)	Test point type 1604 or G 1/4" (ISO 228)
Material of seal	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	12.5 kg

Model code

See last page

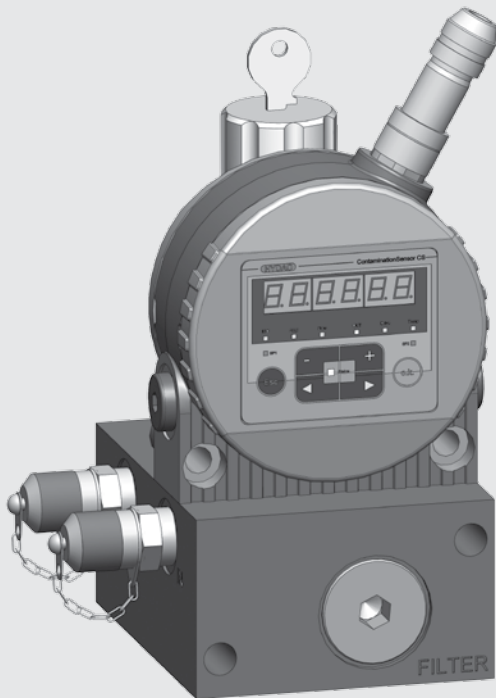
Items supplied

- 1 FMM - P - L - ...
- 1 Operating manual

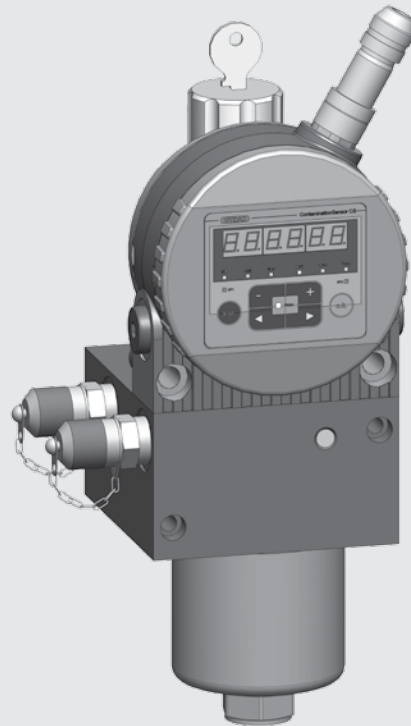
Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...), page 209 onwards.

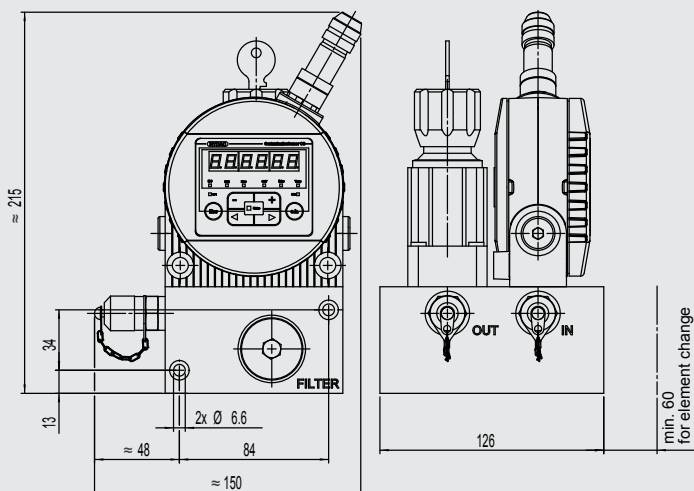
FMM - A - S - ... - 1 - ...



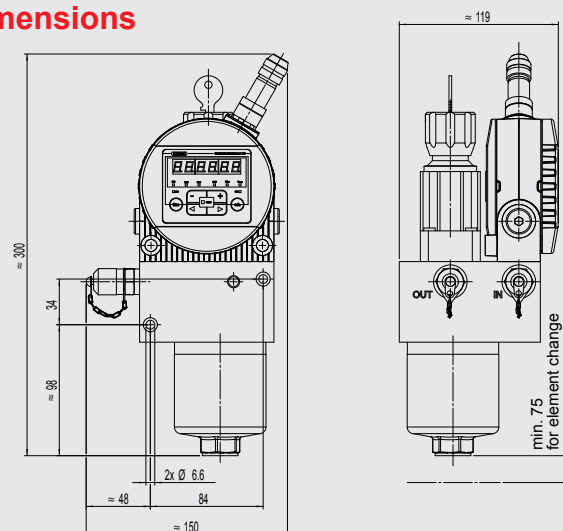
FMM - A - S - ... - 2 - ...



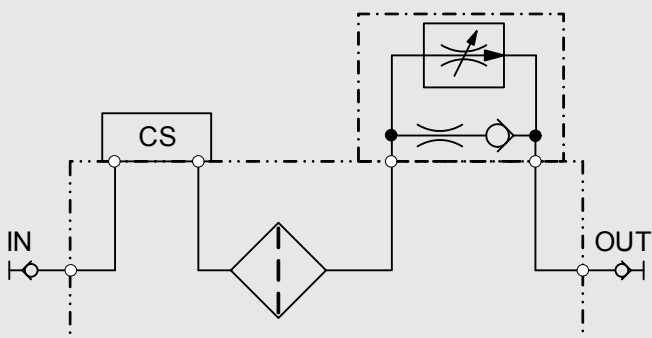
Dimensions



Dimensions



Hydraulic circuit diagram



Technical specifications

Mounting position	horizontal
Max. operating pressure	15 ... 350 bar / 217 ... 5075 psi
Minimum differential pressure	15 bar / 217 psi
Permitted viscosity range	1 ... 350 mm ² /s
Hydraulic connection	Test point type 1604 or G 1/4" (ISO 228)
Material of seal	FKM / EPDM
Fluid temperature range	0 ... +85 °C / +32 ... +185 °F
Ambient temperature range	-30 ... +80 °C / -22 ... +176 °F
Storage temperature range	-40 ... +80 °C / -40 ... +176 °F
Relative humidity	max. 95%, non-condensing
Weight	8.0 kg FMM-A-S-...-1 7.8 kg FMM-A-S-...-2

Model code

See last page

Items supplied

- 1 FMM - A - S - ...
- 1 Operating manual

Accessories

A wide range of accessories can be found in the brochure "Filter Systems Accessories" (E 7.623...), page 209 onwards.

Model code

FMM - O - M - 0 - CS 1 2 2 0 - A - AS - 0 - 0 - 0 / -000

TYPE

FMM = Fluid Monitoring Module

Hydraulic application

- O = Offline (offline circuit < 15 bar) only sensor combination M
- P = Pressure Line (pressure circuit > 15 bar)
- A = Adjustable Flow Control Valve (pressure circuit > 15 bar)
only sensor combination S

Sensor combination

- S = CS1000
- M = CS1000 + AS1000
- L = CS1000 + AS1000 + HydacLab *

Seal

- 0 = FKM
- 1 = EPDM
(not for FMM-O, not for hydraulic accumulator)

Contamination Sensor CS1000 Series

- CS 1210 = ISO / SAE, without display (FPM)
- CS 1220 = ISO / SAE, with display (FPM)
- CS 1310 = ISO / SAE / NAS, without display (FPM)
- CS 1320 = ISO / SAE / NAS, with display (FPM)
- CS 1211 = ISO / SAE, without display (EPDM)
- CS 1221 = ISO / SAE, with display (EPDM)
- CS 1311 = ISO / SAE / NAS, without display (EPDM)
- CS 1321 = ISO / SAE / NAS, with display (EPDM)

Analogue interface of the CS1000

- A = 4 ... 20 mA
- B = 0 ... 10 VDC

Additional sensor

- Z = without
- AS = AS1000
- AS3 = AS3000
- AS31 = AS3100
- Z(AS) = set up for AS1000

Hydraulic accumulator

- 0 = without accumulator
- 1 = diaphragm accumulator SBO 250-0.075 (40 bar gas pressure) [not available in EPDM]

Filter

- 0 = without filter (not for FMM-O)
- 1 = protective filter (25µm) (for FMM-P, optional with FMM-A)
- 2 = DF60 (5µm) (optional with FMM-A)

Options

- 0 = no options

Modification number

- 000 = Modification number

* Set up for HydacLab

Note

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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