

IDS 400 mobile

Affordable, mobile chart recorder

Energy analysis - flow measurement - leakage calculation at compressed air systems



- **Flow**
- **Pressure / Vacuum**
- **Temperature**
- **Moisture / Dew point**
- **Optional third-party sensors**

Internal rechargeable Li-Ion batteries, approx. 8 h continuous operation

Your advantages at a glance

Easy and clear layout:

Very easy operation via 3.5" color display with touch panel

Versatile:

Up to 4 sensors/meters connectable also third-party sensors/meters including power supply

Reliable:

Stores all measured values on a memory card, easy reading out via USB stick possible

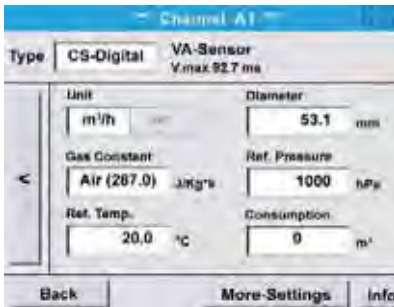
Intelligent energy analysis:

Daily/weekly/monthly evaluations mathematic function for internal calculations, e.g. the typical key data of a compressed air plant:

- costs in € per generated m³ air
- kWh/m³ generated air
- flow of single lines including summation

Easy & intuitional
in its operation
Saves time & costs
on installation

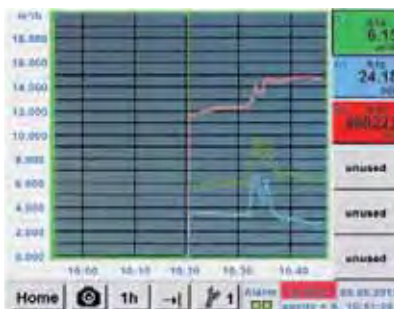
Easy operation via touch screen



Configuration of flow sensor

The flow sensor VA 500 can be adjusted to the respective inner diameter of the pipe in the menu of DS 400 mobile.

Furthermore, the unit, the gas type as well as the reference conditions can be entered. The counter can be set to „zero“ of required.



Graphic view

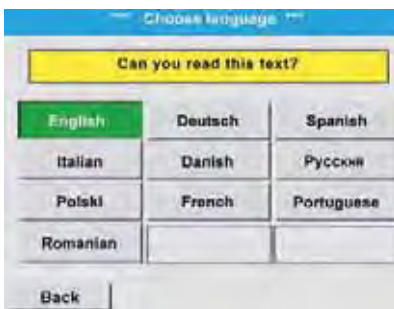
In the graphic view all measured values are indicated as curves.

It is possible to browse back on the time axis by a slide of the finger (without data logger maximum 24 h, with data logger back to the start of the measurement).



Data logger

Measured values are stored in DS 400 mobile by means of the option „integrated data logger“. The time interval can be freely set. Furthermore there is the possibility to fix the starting time and the end time of the data recording. Reading-out of the measured data via USB interface or via the optional Ethernet interface.



Selection of the language

DS 400 „speaks“ several languages. The required language can be selected by means of the select button.



All relevant parameters at a glance

In addition to the flow in m³/h DS 400 mobile shows further parameters like the total flow in m³ and the velocity in m/s

Technical data IDS 400 mobile

Dimensions:	270 x 225 x 156 mm (W x H x D)
Weight:	2.2 kg
Inputs:	2 x 2 sensor inputs for digital or analogue sensor signals
Interface:	USB (standard), Ethernet (optional)
Power supply:	Internal rechargeable Li-Ion batteries, approx 8 h continuous operation, 4 h charging time
Options	
Data logger:	100 million measuring values start/stop time, measuring rate freely adjustable
2 additional sensor inputs:	for connection of pressure sensors, temperature sensors, clamp-on ammeters, third-party sensors with 4...20 mA 0 to 10 V, Pt100, Pt1000

Input signals

Current signal	(0...20mA/4...20mA)
internal or external power supply	
Measuring range	0...20 mA
Resolution	0.0001 mA
Accuracy	± 0.03 mA ± 0.05 %
Input resistance	50 Ω
Voltage signal	(0...1 V)
Measuring range	0...1 V
Resolution	0.05 mV
Accuracy	± 0.2 mV ± 0.05 %
Input resistance	1 MΩ
Voltage signal	(0...10 V / 30 V)
Measuring range	0...10 V
Resolution	0.5 mV
Accuracy	± 2 mV ± 0.05 %
Input resistance	1 MΩ
RTD Pt 100	
Measuring range	-200...850°C
Resolution	0.1°C
Accuracy	± 0.2°C (-100...400°C) ± 0.3°C (further range)
RTD Pt 1000	
Measuring range	-200...850°C
Resolution	0.1°C
Accuracy	± 0.2° (-100...400°C)
Pulse	
Measuring range	min pulse length 500 µs frequency 0...1 kHz max. 30 VDC

Affordable, mobile chart recorder **IDS 400 mobile**



USB stick







Graphic display with touch screen






Up to 4 sensor inputs, including voltage supply for all sensors



Description	Order No.		
	2 sensor inputs board 1	2 sensor inputs board 2	
IDS 400 - Mobile chart recorder with graphic display touch screen and integrated data logger	Digital (Z500 4003)	-----	0500 4012 D
	Digital (Z500 4003)	Digital (Z500 4003)	0500 4012 DD
	Digital (Z500 4003)	Analogue (Z500 4001)	0500 4012 DA
	Analogue (Z500 4001)	-----	0500 4012 A
	Analogue (Z500 4001)	Analogue (Z500 4001)	0500 4012 AA
Options			
Option: Integrated Ethernet	Z500 4004		
Option: Integrated webserver	Z500 4005		
Option: „Mathematics calculation function“ for 4 freely selectable channels, (virtual channels): addition, subtraction, division, multiplication	Z500 4007		
Option: „Totalizer function for analogue signals“	Z500 4006		
Further accessories			
ICS Soft Basic - data evaluation in graphic and table form - reading out of the measured data via USB or Ethernet	0554 7040		
ICS Soft Energy Analyzer for energy and leakage analysis of compressed air stations	0554 7050		
Connection cable on mobile instruments, ODU / open ends, 5 m	0553 0501		
Connection cable on mobile instruments, ODU / open ends, 10 m	0553 0502		
Connection cable for VA/FA series on mobile instruments, ODU/M12, 5m	0553 1503		
Extension cable for mobile instruments ODU/ODU, 10m	0553 0504		
Connection cable for mobile current/effectiv power meter	0553 0506		
Case of all sensors (dimensions: 500 x 360 x 120 x mm)	0554 6006		

Digital	Digital	Digital	Digital
m ³ /h, m ³	°Ctd	A, kW/h	optional
			
Flow sensor	Dew point sensor	Current meters	Third-party sensors with RS 485

Analogue	Analogue	Analogue	Analogue
bar	A	°C	°C
			4...20 mA 0...20 mA 0...10 V Pulse Pt 100 Pt 1000
Pressure sensor	Clamp-on ammeter	Temperature sensor	Third-party sensors analogue output

Digital

Digital

Analogue

Analogue

Flow sensors

for compressed air and gases

- Installation and removal under pressure via standard 1/2" ball valve
- A safety ring avoids the uncontrolled ejection in case of installation/removal under pressure
- Usable for different gases: compressed air, nitrogen, argon, CO₂, oxygen



Dew point sensors

- Extremely long-term stable
- Quick adaption time
- Large measuring range (-80° to +20° Ctd)
- For all driers: Desiccant driers, membrane driers, refrigeration driers
- Easy installation under pressure via the standard measuring chamber with quick coupling



Pressure sensors

- Large selection of pressure sensors with different measuring ranges for each measuring purpose
- Quick installation under pressure by quick coupling
- Pressure sensors 0-10/16/40/100/250/400/600 bar overpressure
- Pressure sensors -1 - +15 bar (under-/overpressure)
- Differential pressure 1.5 mbar up to 4.2 bar
- Absolute pressure 0-1.6 bar (abs.)



Temperature sensors

- Large selection of temperature sensors e.g. for measurement of the ambient temperature or gas temperature
- Pt100 (2-wire or 3-wire)
- Pt1000 (2-wire or 3-wire)
- KTY sensors
- Temperature sensors with measuring transducer (4-20 mA output)



- For direct measurement of the heat volume (in kWh)
- Customary heat meters e.g. at heating systems, heat exchangers, district heating networks and so on can be connected to **DS 400 mobile** either via pulse signals or 4-20 mA



Heat meters-/ water and gas meters



- For the analysis of compressors (load and unload times, energy consumption, switch-on / switch-off cycles) the current input of up to 12 compressors is recorded via clamp-on ammeters
- Measuring ranges of the clamp-on ammeters:

0 - 400 A
0 - 1000 A



Clamp-on ammeters



- Mobile current/effective power meters with 32 A CEE socket and plug for small machines and plants
- Easily to join up into the current circuit by means of an extension cable with 32 A CEE plug
- Measures kW, kWh, cos phi, kVar, kVA
- Data transfer to **DS 400 mobile** via Modbus



Current/effective power meters



- Mobile current/effective power meters with external current transformer for big machines and plants
- External current transformers for clamping around the phases (100 A or 600 A)
- External magnetic measuring tips for measuring the voltage
- Measures KW, kWh, cos phi, kVar, kVA
- Data transfer **DS 400 mobile** via Modbus



Current/effective power meters

Analogue

Analogue

Digital

Digital

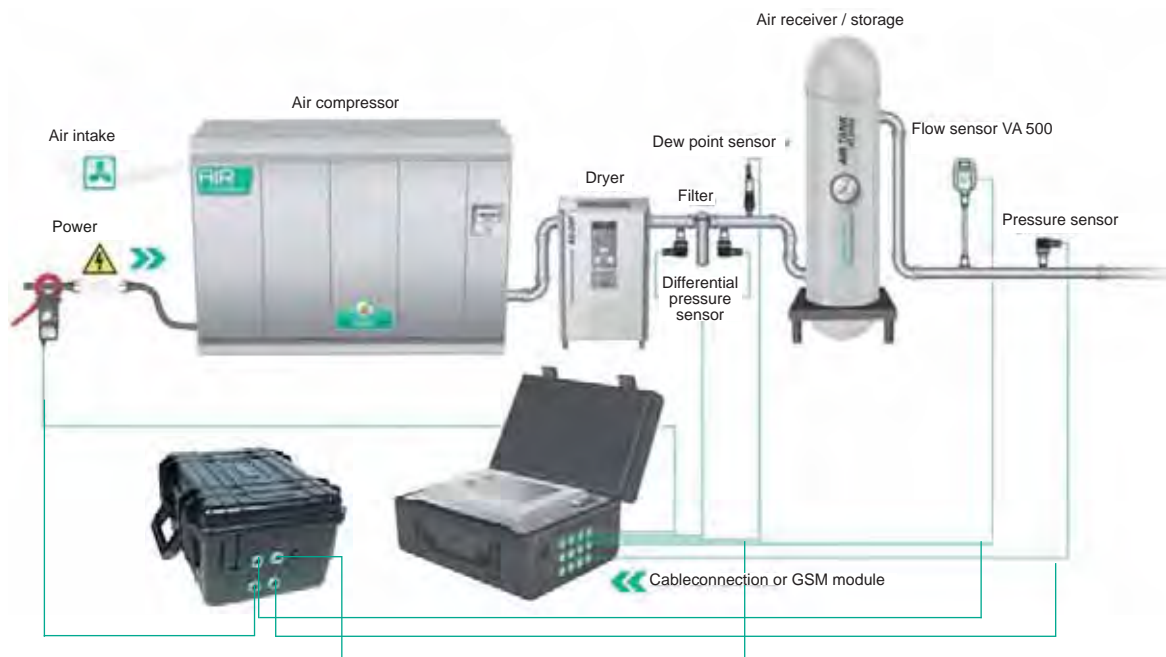
By means of the chart recorder **IDS 400 mobile**, all measuring data of a compressor station can be recorded, indicated, and evaluated. At **digital sensor inputs** all sensors from ICS Schneider like flow sensor, dew point sensor, current/effective power meters and third-party sensors with Modbus RS 485 could be connected.

At **analogue sensor inputs** third party sensors and meters with the following signal output could be connected: 4-20 mA, 0-20 mA | 0-1 V / 0-10 V / 0-30 V | Pt 100 (2- or 3-wire), Pt 1000 (2- or 3-wire), KTY | pulse outputs (e.g. of gas meters) | frequency output | Modbus protocol

Step 1: The measurement

It is a special advantage that up to 12 compressors can be measured with one

IDS 500 mobile at the same time



Step 2:

1. Compressor analysis
(current / power
measurement)

The energy consumption of every single compressor is measured by means of a clamp-on ammeter.

The produced compressed air quantity is calculated by the software on the basis of the performance data of the compressor which have to be calculated. The following parameters are calculated additionally.

Energy consumption in kWh, load-, unload-, stop time, compressor load in %, number of load/ unload cycles.

2. System analysis
(current measure-
ment and real flow
measurement)

The system analysis has the same function like the compressor analysis, however, it additionally offers the possibility to measure the actually produced resp. used quantity of compressed air by means of the flow sensor IVA 500.

With the additional „real flow measurement“ the leakages and therefore the cost share of the leakages in comparison to the total costs in € can be determined.

3. Leakage
calculation

The leakage calculation is done during the production free time (shutdown, weekend, holidays).

The flow sensor IVA 500 measures the supplied quantity of air. During the down time the compressor delivers compressed air in order to keep a constant pressure.

According to statistics even if production is carried out day and night there is at least one short period of time during which all load is switched off. By means of this data the software defines a leakage rate and calculates the incurred leakage costs in €

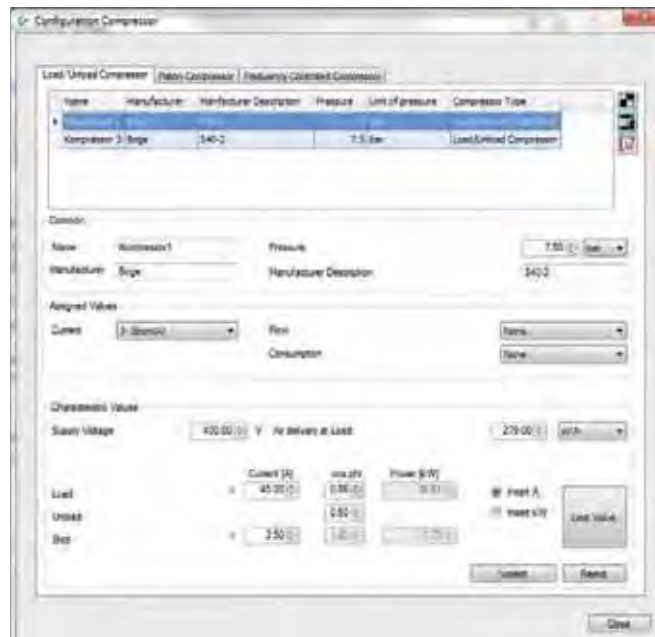
Step 3:

Evaluation at the PC with graphics and statistics

3.1 Entry of necessary parameters

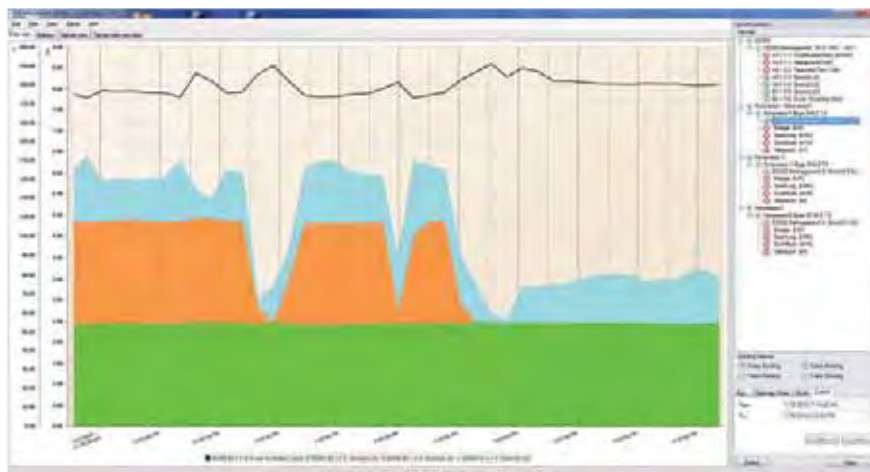
Specific data have to be entered before the analysis is carried out:

- Selection of compressor type (load/idle resp. variable speed drive controlled)
- as well as entry of the performance data according to data sheet
- Period of measurement
- Costs in € for 1 kWh



3.2 Graphic evaluation with day view and week view

Everything at a glance: The user gets a day and a week view of all stored measured data with his company logo (can be easily integrated) at the touch of a button. By means of the zoom and the crosslines function peak values can be determined.



3.3 Compressed air costs in €/ US\$

At the touch of a button the user gets all important data like e.g.

- Energy costs
- Compressed air costs
- Leakage costs in €/ US\$
- Compressor data with load / unload time
- Specific energy kWh/m³
- Costs for 1 m³ in €/ US\$

Analysis of Compressor-Energy and -Costs




Timespan: 1/12/2010 10:39 AM - 1/19/2010 9:44 AM Tariff1: 6:00 AM - 7:59 PM
 Timespan in hours: 167.1 Tariff2: 9:12 Euro
 Total flow rate: Sum of selected compressors Tariff2: 9:00 PM - 6:00 AM
 Limit of leakage: 122.00 Tariff2: 0.12 Euro

Compressor	Quantity (m ³)			Station	Pressure			Flow			Costs (Euro)			Leakage		
	Load	Unload	Stop		Load (bar)	Unload (bar)	Flow (bar)	Flow (m ³ /h)	Flow (m ³ /min)	Load	Unload	Flow	Costs per m ³	Flow (m ³ /h)	Flow (m ³ /min)	Costs (Euro)
C1: Kompressor 1	10.8	0.2	108.2	10	18	18	18	18	18	18	18	18	18	18	18	18
C2: Kompressor 2	10.8	0.2	108.2	10	18	18	18	18	18	18	18	18	18	18	18	18
C3: Kompressor 3	10.8	0.2	108.2	10	18	18	18	18	18	18	18	18	18	18	18	18
Summary	32.4	0.6	324.6	30	54	54	54	54	54	54	54	54	54	54	54	54

Suitable sensors for IDS 500 mobile & IDS 400 mobile

Flow sensors IVA 500:		Order No.	
Flow sensor IVA 500-Max. Version (185 m/s) sensor length 220 mm, incl. 5 m cable to mobile instruments		0695 1124	
Flow sensor IVA 500 High-Speed Version (224 m/s), sensor length 220 mm, 5 m cable to mobile instruments		0695 1125	
Option for IVA 500:			
Sensor length 120 mm		ZSL 0120	
Sensor length 160 mm		ZSL 0160	
Sensor length 300 mm		ZSL 0300	
Sensor length 400 mm		ZSL 0400	
Flow measuring range IVA 520 for compressed air(ISO 1217: 1000 mbar, 20°C)			
Flow meter IVA 520, 0,8... 90 l/min, (R 1/4" DN 8)		0695 0520	
Flow meter IVA 520, 0,2... 90 m³/h, (R 1/2" DN 15)		0695 0521	
Flow meter IVA 520, 0,3... 170 m³/h, (R 3/4" DN 20)		0695 0522	
Flow meter IVA 520, 0,5... 290 m³/h, (R 1" DN 25)		0695 0523	
Flow meter IVA 520, 0,7... 480 m³/h, (R 1 1/4" DN 32)		0695 0526	
Flow meter IVA 520, 1,0... 550 m³/h, (R 1 1/2" DN 40)		0695 0524	
Flow meter IVA 520, 2,0... 900 m³/h, (R 2" DN 50)		0695 0525	
Dew point sensors:			
IFA 510 dew point sensor for mobile instruments, -80...+20°Ctd, incl. mobile measuring chamber, 5 m cable and perforated cap		0699 1510	
IFA 510 dew point sensor for mobile instruments, -20...50°Ctd incl. mobile measuring chamber, 5 m cable and perforated cap		0699 1512	
Connection cable for IVA/IFA sensors:			
Connection cable for IVA/IFA series on mobile instruments, ODU / M12, 5m		0553 1503	
Extension cable, 10 m		0553 0504	
Calibration certificates for flow / dew point sensors:			
5 point precision calibration for flow sensors including ISO certificate		3200 0001	
Precision calibration at -40°Ctd including ISO certificate		0699 3396	
Pressure sensors:		± 1 % accuracy of full scale	± 0,5 % accuracy of full scale
Standard pressure sensor CS 16 from 0...16 bar		0694 1886	0694 3555
Standard pressure sensor CS 40 from 0...40 bar		0694 0356	0694 3930
Standard pressure sensor CS 1.6 from 0...1.6 bar abs.			0694 3550
Standard pressure sensor CS 10 from 0...10 bar		0694 3556	0694 3554
Standard pressure sensor CS 100 from 0...100 bar			0694 3557
Standard pressure sensor CS 250 from 0...250 bar			0694 3558
Standard pressure sensor CS 400 from 0...400 bar			0694 3559
Precision pressure sensor CS -1...+15 bar, ± 0.5 % accuracy of full scale		0694 3553	
Precision differential pressure sensor CS 400, 0...400 mbar differential pressure, 0.075% accuracy of full scale, static pressure max. 40 bar		0694 3560	
Precision differential pressure sensor for further measuring ranges, e.g. 0...75 mbar, 0...2 bar, 0...8 bar, 0...21 bar, 0...70 bar, 0...200 bar, 0...420 bar		on request	
Pressure calibration certificate, 5 calibration points within the measuring range		3200 0004	

Suitable sensors for **IDS 500 mobile & IDS 400 mobile**

Temperature sensors:	Order No.	
Bendable temperature probe Pt 100 Class B, length 300 mm Ø 3 mm, -70... +500°C, 2 m probe connection cable glass fibre/stainless steel with ODU plug 8 pole for mobile instruments	0604 0106	
Screw-in temperature probe Pt 100 Class A, length: 300 mm with measuring transducer 4 to 20 mA = -50 to +500 °C (2-wire technology) (Please order additional the connection cable 0553 0501)	0693 0002	
Temperature probe cable Pt 100, Class A, length: 300 mm, Ø 6 mm, -50...+180°C, with 5 m connection cable with open ends (Please order additional the ODU plug Z604 0104)	0604 0102	
Temperature probe cable Pt 100, Class A, length: 150 mm, Ø 6 mm, -50...+180°C, with 5 m connection cable with open ends (Please order additional the ODU plug Z604 0104)	0604 0100	
Mini temperature probe cable Pt100 Class A, length 25 mm, Ø 4 mm 50°C to +180°C, 5 m probe connection cable with open ends (Please order additional the ODU plug Z604 0104)	0604 0105	
Clamp screwing 6 mm, G 1/2", VA clamping, pressure-tight up to 10 bar	0554 6004	
Temperature calibration certificate 2 measuring points	0520 0180	
Connection cables for pressure sensors / temperature sensors:		
Connection cable for pressure, temperature or external sensors on mobile instruments, ODU / open ends, 5 m	0553 0501	
Connection cable for pressure, temperature or external sensors on mobile instruments, ODU / open ends, 10 m	0553 0502	
Extension cable, 10 m	0553 0504	
Mounted Odu plug for connection on mobile instruments	Z604 0104	
Clamp-on ammeters:		
Clamp-on ammeter 0...400 A TRMS incl. 5 m connection cable	0554 0511	
Clamp-on ammeter 0...1000 A TRMS incl. 5 m connection cable	0554 0519	
Calibration certificate for clamp-on ammeter	0554 3333	
ICS PM 600 Current/effective power meter up to 100 A	0554 5341	
ICS PM 600 Current/effective power meter up to 600 A	0554 5342	
- Mobile current/effective power meter with 3 external current transducers for big machines and plants, - External current transformers for clamping on cables (100 or 600 A), - External magnetic measuring tips for measuring the voltage, -Measures kW, kWh, cos phi, kVar, KVA, - Data transfer for IDS 500 mobile / IDS 400 mobile via Modbus, incl. connection cable for mobile current/effective power meter to mobile instruments, 5 m		
Current transformer 100A/1A consisting of 3 transformers for mobile instruments	Z554 0001	
Current transformer 600A/1A consisting of 3 transformers for mobile instruments	Z554 0002	
Current transformer 1000A/1A consisting of 3 transformers for mobile instruments	Z554 0003	
Optional third-party sensors connectable:		
e.g. heat meters, current meters, gas meters, water meters and so on. To the 12 freely assignable sensor inputs all sensors of ICS Instruments can be connected as well as optional third-party sensors and counters with the following signal outputs: 4-20 mA, 0-20 mA 0-1 V / 0-10 V / 0-30 V Pt100 (2- or 3-wire), Pt 1000 (2- or 3-wire), KTY I pulse outputs (e.g. of gas counters) Frequency output Modbus protocol		

