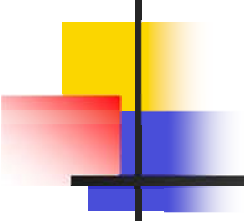# KELLER DCX Data Loggers

DCX-22 Product Line

- DCX-16 / DCX-22 G

- DCX-16 / DCX-22 SG

- DCX-22 AA

- DCX-16 / DCX-22 VG

- GSM-1 / GSM-2

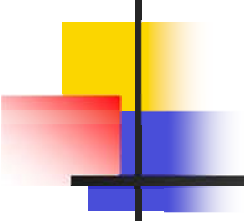- DCX-RC (RainCatcher)

DCX-16 (Ø 16 mm) / DCX-22 (Ø 22 mm)

- Absolute

- Variable installation depth

- Read-out by communication cable

- Accuracy 0,1 %FS (DCX-16: 0,2 %FS)

- All channels can be logged

- Suitable for level an baro measurements

- Autonomous device: all is integrated

- Needs a second device for measuring baro pressure
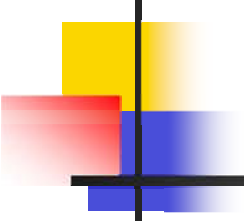
DCX-22 SG

- Absolute

- Diverse cable lengths

- Read-out by communication cable

- Accuracy 0,1 %FS

- All channels can be logged

- Suitable for level measurements
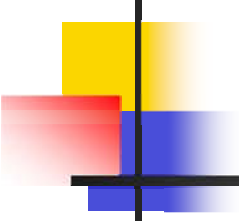
- Battery down under, read out on top of borehole

DCX-22 VG

- Barometric compensated by capillar

- Diverse cable lengths

- Read-out by communication cable

- Accuracy 0,1 %FS

- All channels can be logged

- Suitable for high accuray and low range level measurements

- Battery down under, read out on top of borehole

DCX-22 AA

- Barometric compensated

- Fixed cable length

- Read-out by communication cable

- Accuracy 0,1 %FS

- All channels can be logged

- Suitable for 2 major applications

- Level sensor down under, electronics,
  battery and baro sensor on top in battery pot

DCX-22 AA : Major Applications

Sewage

Sewage is the dumping of over-load of drain water into natural water sources. It's like an over-pressure valve for the drain system.

During a sewage, water-levels are measured and later converted into flow .

This data gives good insight information on the sewarage and serves a better pollution management.

Groundwater Level

Monitoring of changes in ground-water level.

Important for efficient water management like soil hydratation, water saving, dyke fixation and intake of drinking water.

DCX-22 AA used as a sewer

- Registration of dumped sewage

- Installation in sewerage

- Activation by event trigger

- Automatic sewage report
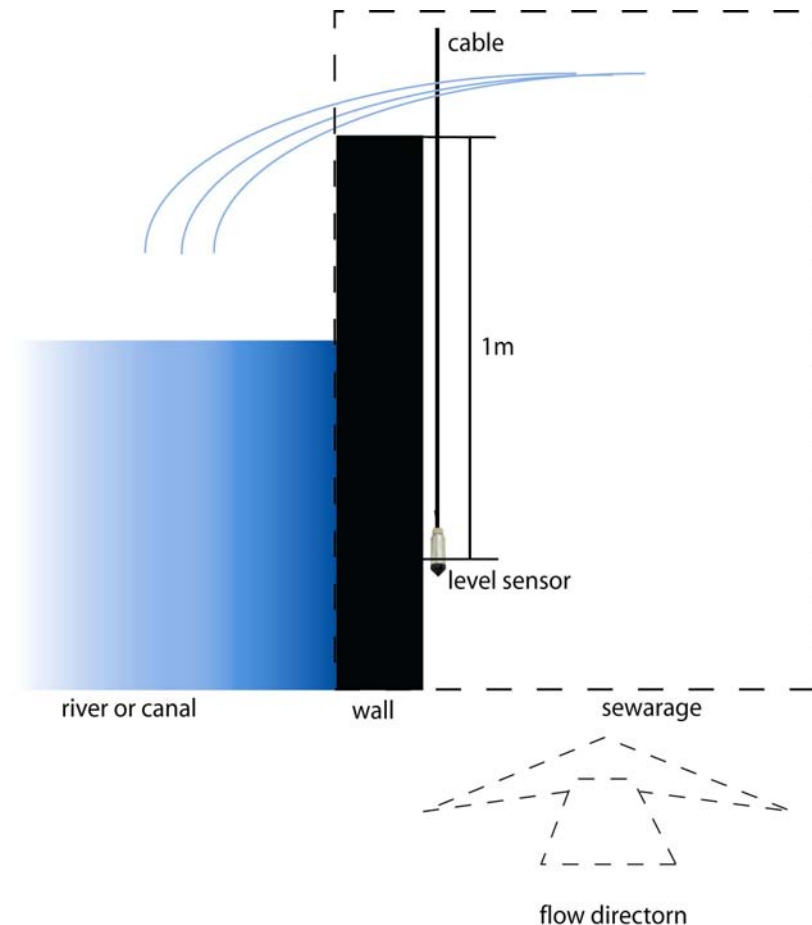
- Combinable with RainCatcher

DCX-22 AA used as a Sewer

What is a sewage ?

• Level sensor is mounted at a certain distance from the topside of the wall, i.e. 1 m.

• This distance is set in the software as activation trigger.

• A log frequency during the event is also set (i.e. 1 minute).

• Sewarage fills after rainfall. When flow is too big, an emercy outlet is used for carrying off the surplus into natural water.

• When water level reaches this level, the sensor starts to register every minute a water level. This value is stored in memory.

• When the water level decreases under trigger level, the logger is deactivated again.

DCX-22 AA used as a Sewer

How is the event trigger set in the software ?

DCX-22 AA used as a Sewer

How is the data converted to a sewage report ?

1. Data from logger is converted to waterlevel

2. From all water levels the event trigger is substracted

3. All values < 0 are eliminated from the datasheet

4. The remaining waterlevels are converted to flow with Poleni's formula : $Q = m \times b \times h^{3/2}$

5. The total time is calculated by subtracting end and beginning of the sewage

6. Average flow [m^3/min] is calculated

7. Average flow is multiplied with duration of the sewage. The quantity [m^3] can be reported.

DCX-22 AA used as a Sewer

**Example
of a
Sewage
Report**

Overstortrapportage

Datum: 02.04.2003
Tijd: 10:38:12
Gemeten met KELLER datalogger

Type: 5.5
Versie: 2.35
Serienummer: 966

Opmerking
#Æ

Datalogger configuratie

Soortelijk gewicht water: 998,000 kg/m^3
Trigger aan (P_aan): 0,100 m (0,010 bar)
Trigger uit: 0,070 m (0,007 bar)
Gravitatie (g): 9,80665 m/s^2

Hoogte (h): (P-P_aan)/d/g

Overstortgegevens

Vormfaktor (m): 1
Breedte (b): 1 m

Formule: Q=1.7*m*b*(h^1.5)

Overstort overzicht

Overstort Nummer	Aanvang	Einde	Duur D:H:M:S	Q[m^3/s]	m^3
1	25.03.2003, 09:26:59	25.03.2003, 09:27:19	0:00:00:20	0,0102	0,2043
2	25.03.2003, 09:30:09	25.03.2003, 10:08:09	0:00:38:00	0,0209	47,6673
3	25.03.2003, 10:24:49	28.03.2003, 13:40:09	3:03:15:20	0,0197	230,5647
			3:03:53:40	0,0508	

Totale overstort   278,4363 m^3

DCX-RC (RainCatcher)
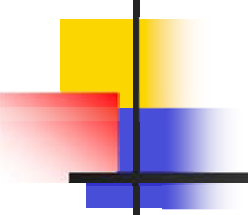
Why a rain datalogger ?

- Reason of sewage data logging is to limit the pollution of natural water.

- If too many sewages take place, the capacity of the sewarage is too small and a local government is forced to invest in a bigger sewarage.

- ….. Unless one can proof that extraordinary precipitation caused the sewage.

- Our DCX-RC (RainCatcher) registrates the rainfall and helps the customer to visualise the quantity of precipitation

- The pressure from the integrated baro sensor can also be used to compensate DCX-22 G / SG

- With our new Multiviewer software, we can plot the data of both Raincatcher and DCX level logger in the same graphic

KELLER

DCX-16, DCX-22 AA / DCX-22/VG/SG
used as a Ground Water Level Datalogger

- Registration of ground water level

- Installation in borehole

- Activation by timer

- Event trigger for special measurements

DCX-16, DCX-22 AA / DCX-22/VG/SG
used as a Ground Water Level Datalogger

Measuring modes / features

- Regular level measurement with a fixed interval

- Regular level measurement with a fixed interval, related to head of borehole or sea level

- Level measurements during pumping (delta p, equals a logarithmic time axis)

- Activation of the logger when level exceeds a preset value (prevents logging zero-values in dry season)

- In combination with our GSM-1 also alarm functionality is offered

DCX-16 / DCX-22: Commercial Aspects

Advantages DCX-16 / DCX-22 Level Data Loggers

- Barometric compensation in the data logger

- Readout facility on top of borehole

- User-friendly software

- Software available for Windows and WindowsCE (PocketPC) devices

- Complete package delivery: everything the customer needs (cable, software, batteries) is included in the delivery

- Rugged and compact design

- Battery life 10 years

- Battery can be changed by the user

- Very complete productline: Modem (GSM data transfer), rain data logger

DCX-16 / DCX-22: Commercial Aspects

Differences between DCX22-AA and DCX16 / DCX22-VG

DCX-22 AA

- Limited and fixed cable length

- Accuracy 0,1 %FS

- Lowest range 5 mWC

- IP68

DCX-16 / DCX-22 VG

- Unlimited cable length

- Accuracy 0,1 %FS

- Lowest range 2 mWC

- IP65

- Very stable

DCX-22 Application Guide

DCX-22 Application Guide				
Application	**DCX-22 AA**	**DCX G**	**DCX SG**	**DCX-16 VG**
Borehole	x	x	x	x
Borehole which can be flooded	x	x	x	-
Borehole which is permanently flooded	-	x	x	-
Borehole with baro comp	x	-	-	x
Regular level measurement with high acc	-	-	-	x
Regular level measurement with baro comp	x	-	-	x
Low range measurement	-	-	-	x
Sewage	x	-	-	-