

Technical Information

Interfacing

Input/Output Interface (0409)

8 digital inputs and 8 outputs are provided to operate the mix control sequence (i.e. cycle start, cycle reset, cement and admix request and acknowledge etc., alarm, etc.). Voltages of input/output modules (AC or DC) to suit customer requirements. An analogue input is provided for water weighing.

Analogue Output

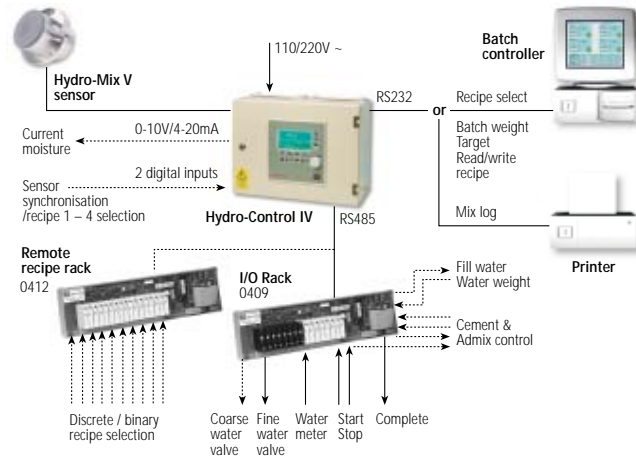
1 Analogue output is provided from the front panel indicating current moisture.

RS 232 Communication

For reading and writing all information relating to recipes, system operating parameters, and diagnostic information.

Remote Recipe Rack (0412)

16 inputs available for discrete/binary recipe selection.



Technical specification

Mains supply voltage:
110/220/240V AC 50/60 Hz.

Keyboard:

Sheet keyboard with polyester overlay.

Graphic display:

240mm x 128mm Graphics module with backlighting.

Recipes:

Memory for 200 recipes.

Security:

Critical operations protected by pass code system.

Communications:

RS232 for connection to printer or batch computer.
Remote recipe selection by digital inputs optional.

Sensor connection:

The Hydro-Mix V microwave sensor is connected to the Hydro-Control IV by 6 core screened cable with 16/0.2mm strands.

Operating temperature range:

0-50°C.

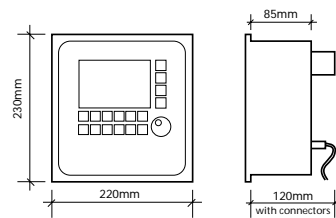
Electromagnetic compatibility:

Meets the requirements of the Electromagnetic Compatibility Directive 89/336/EEC.

Dimensions

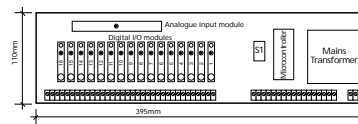
Operator panel (for panel mounting)

Panel cut-out size 201mm wide x 211 mm high.



Input/Output Modules (0409, 0412)

Depth of I/O unit (including DIN rail mounting) 100mm max.



Steel Enclosure (Optional)

Dimensions:
480mm wide x 360mm high x 240mm deep.
Door hinged from the right.

Hydro-Control IV

PRODUCT INFORMATION SHEET



High performance
water control unit for
mixers in automated
plants



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Hydro-Control IV

defining the standards of microwave moisture measurement

The Hydro-Control IV, in conjunction with the Hydro-Mix V sensor, controls the addition of water in the mixer. Irrespective of the variation of the moisture in the aggregates, the Hydro-Control IV will achieve precisely the programmed moisture content to the highest possible level of accuracy. Minimum mix cycle time is achieved by means of the unique 'auto-track' algorithm.

The display provides a wide range of information including trace of the sensor signal and error analysis in graphical form. New mix recipes are calibrated automatically at the touch of a button.

The system is ideally suited for operating with high volume automated concrete product manufacturing plants and may either be fitted with new control systems or retro fitted with older systems.

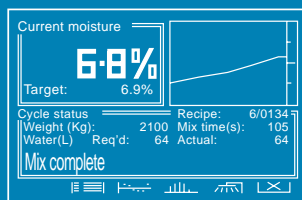


Figure 1: The screen display of the Hydro-Control IV

Function

The Hydro-Control IV completely controls the mix cycle, receiving a 'start' signal from the control system when all the materials are in the mixer (figure 2). Using the moisture reading at the completion of the 'dry mix' period the Hydro-Control IV computes the precise amount of water to be added to attain the programmed (or target) moisture content for the selected recipe. The water is added in 'one shot' thereby minimising the mix cycle time. At the completion of the wet mix period, if the mix moisture content is within the set tolerance limits, control reverts to the batch controller and the mix is discharged. If the moisture content is outside the pre-defined limits an alarm is activated and the mix is held in the mixer until corrective action has been taken and the alarm accepted.

Highest accuracy - minimum mixing time

Appropriate signal conditioning coupled with the unique 'auto-track' algorithm ensures the 'dry' and 'wet' readings are taken as soon as the mix becomes homogeneous. This is indicated by a horizontal line appearing on the screen (figure 3), at which point the average of a sample of approximately 50-100 readings is taken. This technique provides the highest possible accuracy within the minimum mixing time.

Moisture display

In standard operating mode the screen displays the reading as well as a continuous trace of the moisture in the mixer (which may be calibrated to laboratory results). Other relevant mix status parameters are displayed as appropriate at the point in time during the mix cycle (figure 2).

Mix sequence programmes

The system will operate a variety of different programmes to meet all operational requirements (including pre-wetting of aggregates). Typical sequence shown in figure 2.

Water addition

The Hydro-Control IV operates coarse and fine water feed, monitors water addition by counting pulses from water meter (or signal from load cell if weighed) with in-flight compensation. The quantity of water added is calculated automatically or may be pre-set. Water trim button available to operator with restricted configurable limits. Any such adjustment is recorded separately in the mix log record, as is water added erroneously due to leaking valves etc. The system also has an alarm facility for a defective water meter.

Cement addition

The Hydro-Control IV will control cement addition if necessary, but this is not normally required.

Admixture addition

Facility for controlling addition of two separate admixes if required - before/during/after addition of water.

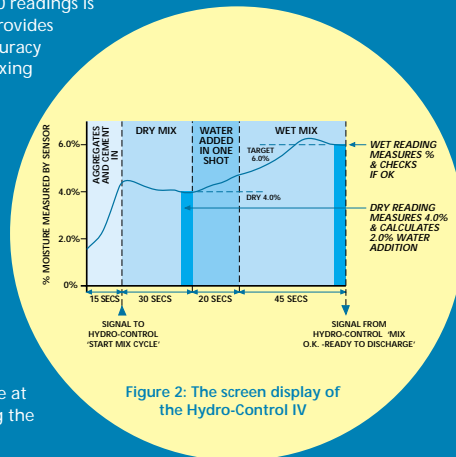


Figure 2: The screen display of the Hydro-Control IV

Recipes

May be selected manually from the operator panel, but more usually remotely using digital or serial communication. The Hydro-Control IV holds up to 200 recipes. Each recipe stores all the information required to operate the cycle, including wet and dry cycle times, target moisture % and preset, tolerances, calibration constants etc.

Calibration

Simple automatic calibration at the touch of a button.

Alarms and event reporting

Comprehensive alarms for 17 different conditions (including sensor fault, water meter fault, mix out of tolerance etc), which may be configured to suit operational requirements. The last 100 alarm occurrences may be viewed on the screen.

Sensor trace facility

High speed traces of the sensor signal (100 readings per second) may be recorded on the screen. The scale may be adjusted by zooming in or out. This

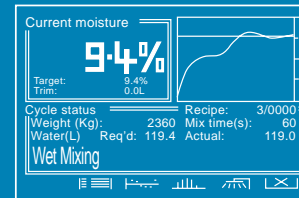


Figure 3: Screen display showing auto-track facility

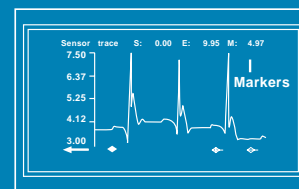


Figure 4: Screen display showing mixer trace at 100 readings per second

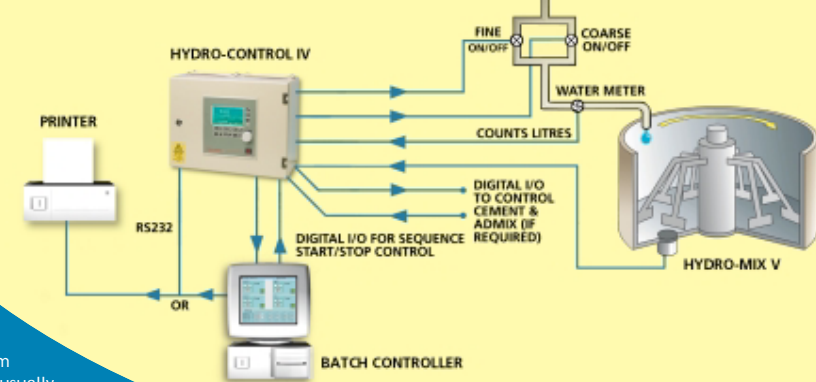


Figure 5: System overview

may be used for diagnostic purposes, or for programming readings from the sensor only to occur when the sensor is covered by material (figure 4).

Full mix data logging

An invaluable diagnostic facility that enables the performance and accuracy of the Hydro-Control IV unit to be fully investigated over the last 100 mixes.

In Written Format

All the information needed about the last 100 mixes may be viewed or printed (if used with printer option). Such information includes:- Batch and recipe number; batch weight; target and actual water added; 'dry' moisture % reading and final % reading; w/c ratio; water adjustment - trim/error/manual; mix cycle times - 'dry', 'wet' and total; fault conditions; calibration readings.

In Graphical Format - Error Analysis

Deviation from target in % moisture for the last 100 mixes, either as a histogram or as a trend display.

Ordering guidance notes

When ordering, the relevant order codes should be specified. These notes are to assist with the correct identification of the components appropriate to your application. Please read these in conjunction with the Technical specification overleaf, and the current price list prevailing at the time.

Items marked with an * are optional.

- The standard system comprising the operator panel unit (order code HC04) and the input/output rack (0409) are supplied as separate units. (figure 7)
- * The units may be supplied in a steel enclosure (0420). (figure 6)
- * Remote Recipe Rack (0412) enables remote recipe selection by digital inputs (not required when using serial communication).
- Control voltages for both the I/O racks (0409 & 0412) must be specified, as well as the number of I/O modules required. Ask for 'Configuration Check List'.



Figure 6: Steel enclosure unit



Figure 7: Standard unit