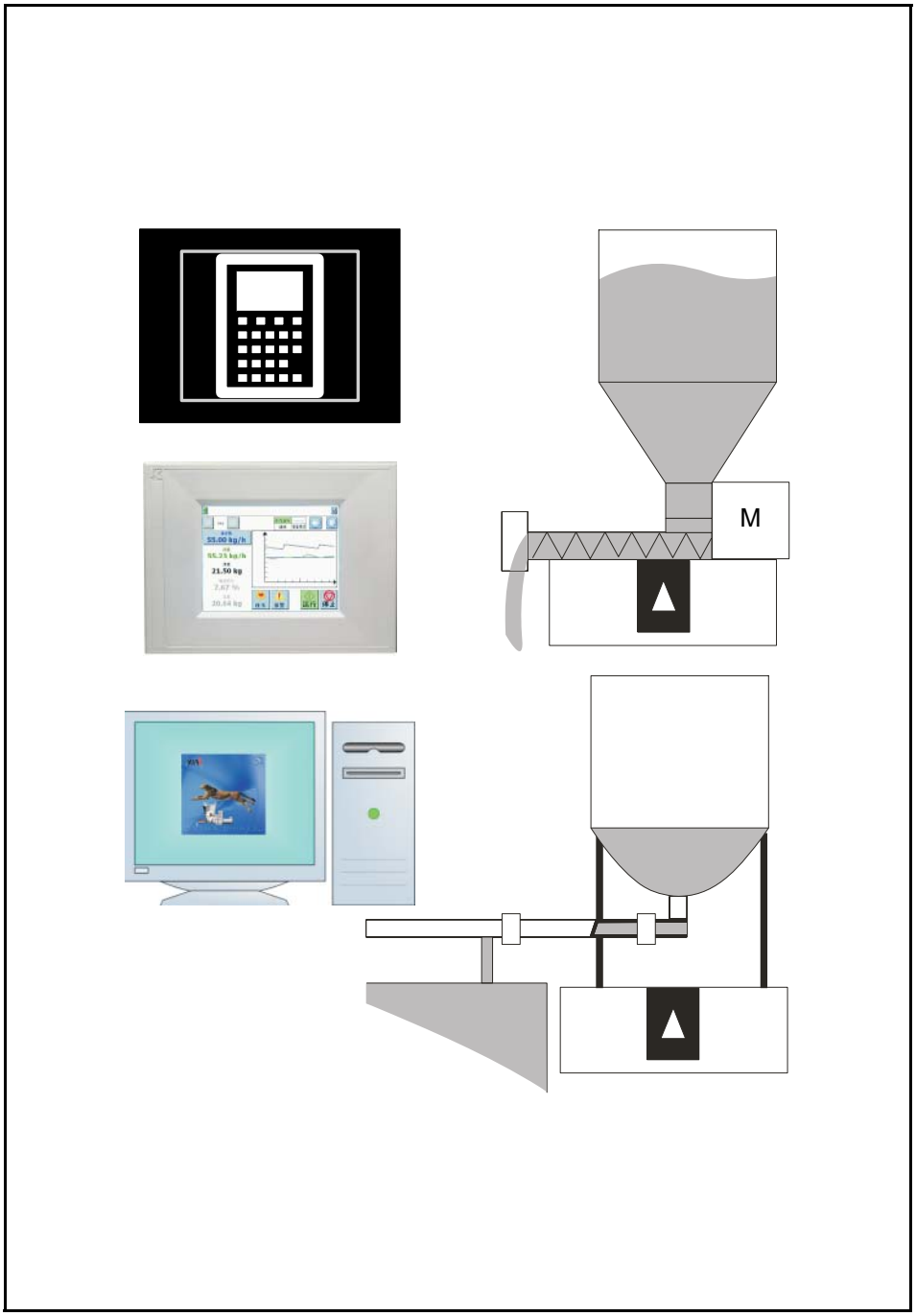
PROGRAMMING INSTRUCTIONS

KCM LWF Programming
Software Version 2.8



Read this document prior to operating the device.
This document contains all safety and warning notes.

Original operating instructions

0590020601-EN Rev. 1.8.0

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Before you call...

⇒ Do you have alarm displays? Are you able to eliminate the causes?

⇒ Have you modified part of the system, product or operating mode?

⇒ Have you tried to remedy the fault in accordance with the operating instructions?

⇒ Note the project or order number. You will find these on the machine or in the system manual.

- Example: 0403214

Using the manual:

⇒ This arrow identifies an individual action.

1. Numbers identify a sequence of actions which have to be executed step-by-step.

▲ This symbol identifies a general safety note.


Reference to another manual.


Important information.


This symbol indicates that tools are required for the following task.


Specifies where information or a situation must be checked.

If an error or ommission is found, please contact:
documentation@coperionktron.com

Doc. No.: 0590020601-EN
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1 Programming Reference

See operating manual for operator instruction with safety notes

The following programming instructions covers LWF application programming for the displays KSU-II/KCM, KSL, K-Vision, KSC.
This manual is only for skilled staff instructed by Coperion K-Tron.

The menu architecture for the application is the same for all displays. The main differences between the displays are the navigation and the short variable name for the KSU-II/KCM.

1.0.1 Additional programming information

See instructions below for information on the following points:

- User interface operation; keypad and display function
- For feeder calibration
- General operation
- Technical specifications

KCM/ KSU-II operation with calibration procedures

K-Vision operation with calibration procedures

KSC operation with calibration procedures

KSL operation with calibration procedures

Smart Connex II Overview

KCM General PC Utilities

KCM Electronics

1.0.2 Manual notation

The following is standard through out this manual.

- KSU-II / KCMParameter name shown as <PARAM NAME>
- KSL / KSC Parameter name shown as <Param Name>
- Parameter value shown as <Param Value>
- Menu name as <Menu NAME>
- Alarm message as <Alarm Message>
- Display indication or key action result as <INDICATION>.
- Dialog box indication as <Dialog>.
- Key or button as **KEY**

The first parameter name (in CAPs) is for KSU-II/KCM display. The second parameter name below the first is for the KSL and KSC.

The **BOLD PARAMETERS** are command functions for the KSU-II/ KCM. For KSL and KSC functions keys are used instead of command functions.

1.0.3 Abbreviations and terminology

- Config port = diagnostic serial data port
- CPU = central processing unit, microprocessor
- HCU = Hurricane pneumatic loader control
- Host Channel = serial data connection to remote host computer
- HSU = User interface for HCU
- HMI = human, machine interface, usually a PC utilizing a commercial SCADA software package
- Internal Channel = serial data connection to SFTs/HCU and internal motor drives
- KCM = K-Tron control module, the SmartConnex II integrated feeder controller with local keypad and display
- KCM-SD = KCM with status display only
- kgr = host communication file residing in KCM
- KSC = K-Tron Smart Commander, a PC based HMI system for use with up to 30 controllers
- KSL = K-Tron line interface for up to 8 feeders
- K-Vision = K-Tron line interface for up to 16 feeders
- K-Net = KCM serial data connection to KSU-II, KSL, K-Vision or KSC
- K-Port 1 and K-Port 2 = data port for a K-Tron specific communication
- KSU-II = K-Tron single unit user interface for the KCM
- LWF = loss-in-weight feeder
- LSR = Pneumatic loader control
- MDU = Common representation of all types of drive boards (450 / 1600 watt DC drive, AC VFD drive, AC Interface, Stepper motor drive, Vibratory drive)
- pcb = printed circuit board
- SCADA = supervisory, control and data acquisition system
- Smart Connex II = second version of SmartConnex architecture
- SFT = Smart Force Transducer
- WBF = weigh belt feeder

1.0.4 Menu overview

- Product Change menu
- Calibration menu
- Alarm menu
  - Alarm limits sub-menu
  - Alarm setup sub-menu
- Tuning menu
- Refill menu
- Scale menu
  - General sub-menu
  - SFT sub-menu
  - Pressure Comp sub-menu
    appears when a EPC is connected to KCM
- Machine Setup menu
  - General sub-menu
  - Motor sub-menu
  - Service setup sub-menu
  - Performance sub-menu
  - Agitator sub-menu
    appears when a second KCM AC VFD is connected to KCM
  - ActiFlow sub-menu
    appears when a ActiFlow is connected to KCM
  - Impactor sub-menu
    appears when a output is assigned as impactor
- I/O Setup menu
  - Digital Input sub-menu
  - Digital Output sub-menu
  - Setpoint Input sub-menu
  - Analog Output sub-menu
  - Modbus I/O sub-menu
- Loader menu
  hidden if HCU or LSR is connected
- HCU Loader menu
  appears when HCU is connected to KCM
- LSR Loader menu
  appears when LSR is connected to KCM
- System menu
  - Communications sub-menu
  - SW Versions sub-menu
  - Parameter Backup sub-menu
  - Clock sub-menu
- Security menu

1.1 <PRODUCT CHANGE menu>

This menu allows easy product changeover.

See KCM/ KSU-II operation manual for calibrating the feeder.

Parameter	Definition	
REFILL Refill Enable	ENABLED	Setting for automatic refill. The net weight alarm limit is active.
	DISABLED	The feeder hopper can be emptied without refilling being triggered. The net weight alarm limit is disabled.
	IF RUNNING	Refill is enabled if the feeder runs, otherwise it is disabled.
	Default: DISABLED	
	Setting: Normally set to <Enable> but for cleaning set to <Disable>.	
REFILL MAX. Refill Level Maximum	Input of the upper refilling limit at which refilling is stopped. Input range: <0.95 x Gross scale range Default: 0.06 kg Setting: 0.75*hopper volume* density or 0.75*(Scale range-tare) whichever is less. Adjust as necessary **Note:** Do not exceed the hopper capacity or scale capacity when entering the top refilling limit. See section 1.5.1.	
REFILL MIN Refill Level Minimum	Input of the lower refilling limit at which refilling is started. Input range: < Refill Maximum Default: 0.05 kg Setting: Initially set REFILL MIN = 0.4 x REFILL MAX. **Note:** Feeding behavior can be affected if the refilling limit is set too low. Do not uncover feeder horizontal agitator. See section 1.5.2.	
START REFILL NOW	This command starts the refill when the net weight is less the <REFILL MAX>.	

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Parameter	Definition
GEARSWITCH **Note:** Not used for vibratory feeders	Defines how the unit will change gear reductions on the K2 feeder with motor reversing gear reduction switching. To activate, a digital output must be set to <HILoGear>. Selections are: High, Low, Auto Hi, Auto Lo • **<High>** selects high speed/lowest gear reduction and scales the average feedfactor accordingly. • **<Low>** selects low speed/highest gear reduction and scales the average feedfactor accordingly. • **<Auto Hi>** When entering a setpoint which will generate a drive command of more than 50% and the <GEARSWITCH> is on Auto Lo, the gear will switch to high and the <GEARSWITCH> parameter changes to Auto Hi. • **<Auto Lo>** When entering a setpoint which will generate a drive command of less than 10% and the <GEARSWITCH> is on Auto Hi, the gear will switch to low and the <GEARSWITCH> parameter changes to Auto Lo. **Notes:** • See more detail of operation section 2.1. • To fix the reduction at either High or Low speed, select either High or Low entries. • With the AC VFD drive, no external relays are required.
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Parameter	Definition
AUTO TARE **⚠ CAUTION**	This command sets the net weight to zero and overwrites the tare weight <TARE>. **Disable the refill first then do the taring.** ⇒ For KSU-II/KCM select parameter then press ENTER ⇒ For KSL press **F5-MORE** then TARE ⇒ For KSC press Tare **Notes:** • A Confirm dialog pops up if the tare command was the first one after a power-up or after the feeder was previously running. The AutoTare process is: The operator hits the AutoTare command . The confirm dialog pops up, telling the operator to verify that the machine is empty. The pop up dialog goes away by itself after 10 seconds or the operator may hit ESC sooner. The operator then hits the AutoTare again. This time it is executed. • The function <AUTO TARE> is used to establish the feeder weight when the product hopper is empty. • If the Tare weight matches the empty feeder weight, net weight shows the weight of the feeding material in the hopper
TARE Tare Weight	Input of a known tare value with the keypad. Normally it is automatically updated when executing the AutoTare function. Input range: 0 to weighing range
NET WEIGHT Net Weight	Display of the current weight of the feeding material on the scale. Net weight = Gross Weight - Tare Range: Display only 0 to weighing range
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Parameter	Definition
AUTO FF CALIB **⚠ WARNING**	The starting feeding factor (maximum mass flow rate) is calculated during calibration in volumetric mode (constant speed). For this the program parameter <CAL DC> and <CAL TIME> have to be entered. Material is discharged for the value of <CAL TIME> and the starting feeding factor is calculated. ▲ This command will start the feeder. Make sure that nobody is working on the machine. **For KSU-II/KCM** ⇒ Select <AUTOFF CALIB> ⇒ Press ENTER ⇒ Press RUN **For KSL** ⇒ Press **MORE-F5** ⇒ Press Auto Cal ⇒ Press **RUN**. **For KSC** ⇒ Press Calc. Feedfactor ⇒ Press **RUN**. **Notes:** • AUTOFFCALIB can be aborted with the **STOP** key. • The drive command is set by the value <CAL DC>. • The calibration time by <CALIB TIME>. • The discharged amount of product is shown by <CAL PROD FED>. • The calibration can only be started when the feeder is not running. • Refilling and feeding errors during calibration reset the program parameter FF INIT to <0> and activate the <FEEDFACTOR ERR> alarm. • Auto set Max Setpoint one time if left at default and a Feed Factor calibration was run.
CALIB REMAIN [s]	A count down timer for the auto calibrate cycle. It shows how many seconds are left in the Calibration cycle.

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Parameter	Definition
INIT FF Initial Feedfactor	Input of the starting feeding factor to determine the motor speed. The Drive Command is calculated as follows: DriveCommand(%) = 100 x (Setpoint/Initial Feedfactor) The starting feed factor can also be calculated with the command variable <AUTO FF CALIB>. Value of <0> will cause a Feedfactor Alarm. The feeder will not run with a Feedfactor of <0>. Input range: 0 to 99999 Default: 100 kg/hr If a prior value has not been recorded for entry, enter a value equal to the <Maximum Setpoint> to start.
BULKDENSITY Bulk Density	If the variable <VOL RATE>, in the <SERVICE VARIABLE INDEX>, is set any value other than <0>, this variable will be displayed. As the feeder runs in gravimetric control, the Bulk Density value will be updated by the calculation: BD = FF/VOL RATE **Notes:** • To use this variable, do the following: 1. Enter the bulk density (BD) of the material being fed. 2. Perform an Auto Feedfactor calibration. The result is the value <VOL RATE>, calculated as the ratio of Feedfactor (FF) / Entered Bulk Density. The value <VOL RATE> is found in the Service Variable Index. • When the feeder runs in gravimetric control, the <BULKDENSITY> parameter will reflect the current material bulk density.

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Parameter	Definition
EMPTY FDR **⚠ WARNING**	Empty feeder function. When started, the feeder runs at a drive command of 70%. The feeder stops automatically if no weight loss is detected. ▲ This command will start the feeder. Make sure that nobody is working on the machine. ⇒ For KSU-II/KCM select EMPTY FDR, then press **ENTER**  twice then **RUN**  . ⇒ For KSL press **MORE-F5**- then press  then press **RUN**. ⇒ For KSC, press the  then **RUN**. **Notes:** • The <EMPTY FDR> can be aborted with the **STOP** key. • <Empty Drive Cmd> may be changed by the Service Variables. • The <Refill> is automatic disabled. Be sure that the refill is not started externally. • After finish the work enable the refill again. • The Net Weight Low alarm is also generated when the Empty Fdr cycle finishes.
ActiFlow CALIB	ActiFlow calibration function 1. Fill the feeder with material. 2. Set material characteristic “Easy, Medium, Hard or Manual“ in the <MACHINE SETUP menu> <ACTIFLOW sub-menu>. 3. Run the ActiFlow calibration. **Notes:** • This value is only displayed if an ActiFlow is connected. • This calibration routine will run a frequency sweep on the ActiFlow to find the mechanical resonance point of the feeder. During the calibration is no material fed. • Its important to have the feeder filled with material to a normal operating level before running this step, because the resonance point is significantly affected by material.

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Parameter	Definition
SCREW FILL **⚠ WARNING**	Function for filling the feeder screws. When started, the feeder runs at a drive command of 70%. The feeder stops automatically when weight loss is detected. ▲ This command will start the feeder. Make sure that nobody is working on the machine. ⇒ For KSU-II/KCM select <SCREW FILL>, then press **ENTER** (ENTER) twice then **RUN** (RUN). **Notes:** • The <SCREW FILL> can be aborted with the **STOP** key. • <Empty Drive Cmd> may be changed by the Service Variables.
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1.2 <CALIBRATION menu>

Use the <CALIBRATION menu> to perform feeder calibration.

If the VOL RATE function is activated in the Service Variable Index, the volumetric rate will be calculated if a product bulk density is entered in the <PRODUCT CHANGE menu>.

Parameter	Definition
INIT FF Initial Feedfactor	Input of the starting feeding factor to determine the motor speed. The Drive Command is calculated as follows: DriveCommand(%) = 100 x (Setpoint/Initial Feedfactor) The starting feed factor can also be calculated with the command variable <AUTO FF CALIB>. Value of <0> will cause a Feedfactor Alarm. The feeder will not run with a Feedfactor of <0>. Input range: 0 to 99999 Default: 100 kg/hr If a prior value has not been recorded for entry, enter a value equal to the <Maximum Setpoint> to start.
AVG FF Average Feedfactor	The value shows the estimated mass flow value expected at 100% drive command and is calculated as (not for vibratory feeders): AverageFeedfactor = 100 x (Massflow/DriveCommand(%) Average Feedfactor represents the massflow capacity of the feeder and is affected by bulk material characteristics and the current feeder mechanical configuration. Input range: Display only **Note:** The feeder will not run with a Feedfactor of <0>.

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Parameter	Definition
AUTO FF CALIB **⚠ WARNING**	The starting feeding factor (maximum mass flow rate) is calculated during calibration in volumetric mode (constant speed). For this the program parameter <CAL DC> and <CAL TIME> have to be entered. Material is discharged for the value of <CAL TIME> and the starting feeding factor is calculated. ▲ This command will start the feeder. Make sure that nobody is working on the machine. **For KSU-II/KCM** ⇒ Select <AUTOFF CALIB> ⇒ Press ENTER ⇒ Press RUN **For KSL** ⇒ Press **MORE-F5** ⇒ Press Auto Cal ⇒ Press **RUN**. **For KSC** ⇒ Press Calc. Feedfactor ⇒ Press **RUN**. **Notes:** • AUTOFFCALIB can be aborted with the **STOP** key. • The drive command is set by the value <CAL DC>. • The calibration time by <CALIB TIME>. • The discharged amount of product is shown by <CAL PROD FED>. • The calibration can only be started when the feeder is not running. • Refilling and feeding errors during calibration reset the program parameter FF INIT to <0> and activate the <FEEDFACTOR ERR> alarm. • Auto set Max Setpoint one time if left at default and a Feed Factor calibration was run.
CAL PROD FED Calibrate Product Fed	Shows the amount of material discharged during calibration cycle as calculated by the controller. Input range: Display only in set units

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Parameter	Definition
CAL CORRELA-[%] Calibrate Correlation **Note:** Not used for vibratory feeders	Will be automatically calculated during calibration. The value shows the reliability of the calibration data. A value of 100% means that the weight samples taken during calibration are extremely uniform indicating smooth product discharge and no weight disturbances. Input range: Display only [%] **Note:** Best to achieve a value >90%
CAL CORR LIM-[%] Calibrate Corr Limit **Note:** Not used for vibratory feeders	If the <CALIB CORRELATION> is below this limit value the feedfactor will be set to <0>, the calibration test aborted and a Feedfactor Alarm will be generated. Input range: 0 to 99.9% Default: 80% **Notes:** • This value self-adjusts after each completed calibration cycle. • Start with 80% and raise to 90% if able. This value will change after each calibration test.
CAL DC-[%] Calibrate Drive Cmd **Note:** Not used for vibratory feeders	Drive command used during the auto calibration cycle. Input range: 0 to 100% Default: 10%
CAL TIME-[sec] Calibrate Time **Note:** Not used for vibratory feeders	Input of the duration of the automatic calibration cycle. Input range: 15-999 seconds Default: 30 seconds
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1.2.1 <FEEDFACTORS sub-menu> for vibratory feeders

The following parameters are only displayed if a vibratory feeder is connected.

Parameter	Definition
MF @ 8% DC	These individual values are calculated automatically by the function <AUTO FF CALIB>.
Vibratory FF 8%	When the setpoint change exceeds the <SEPT CHG LIM>, the controller switches to using the appropriate MF value at the Drive Command expected.
MF @ 12% DC	
Vibratory FF 12%	
MF @ 17% DC	
Vibratory FF 17%	
MF @ 23% DC	
Vibratory FF 23%	
MF @ 33% DC	
Vibratory FF 33%	
MF @ 50% DC	
Vibratory FF 50%	
MF @ 70% DC	
Vibratory FF 70%	
MF @ 100% DC	Only Display.
Vibratory FF 100%	

1.3 <ALARM menu>

This menu sets the alarm limits.

Any alarm that is set in percent, is disabled when the entry is <0>.

1.3.1 <ALARM LIMITS sub-menu>

Parameter	Definition
MASSFLOW ERR+[%] Massflow (+) Alarm Limit MASSFLOW-[%] Massflow (-) Alarm Limit	Massflow error limit is the permissible difference in percentage between the setpoint and mass flow without triggering an alarm. Input range: 0 to 100% Default:10%
DRIVE CMD HI [%] Drive Command High Limit	The Drive Command High alarm is triggered when <Actual Drive Command> exceeds this value. Input range: >DRIVE CMD LO to 102% Default: 99%
DRIVE CMD LO [%] Drive Command Low Limit	The Drive Command Low alarm is triggered when <Actual Drive Command> is below this value. Input range: < DRIVE CMD HI to 0% Default: 0%
FF DEV LIM [%] Feedfactor Deviation Limit	Maximum permissible difference between the AVG FF (Average Feedfactor) and the INIT FF (Initial Feedfactor). Not for vibratory feeders. Input range: 0 to 100% Default:0%
MAX REF TIME [sec] Refill Time Max or Refill Time Maximum	Input of the maximum refilling time. See section 1.5.4 for more detail. If the maximum/upper refilling limit is not reached when this time has passed, an alarm will be triggered. Input range: 3 to 999 seconds Default: 30 seconds
NW LO LIMIT Net Weight Low Limit	Minimum product level, by weight, below which an alarm is immediately triggered. If this condition is triggered, the controller switches to volumetric control. Input range: 0 to < REFILL MIN Default: 0.0 kg-no alarm
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Parameter	Definition
NW HI LIMIT Net Weight High Limit	Maximum product level, by weight, above which an alarm is immediately triggered. If this condition is triggered, the controller switches to volumetric control. Input range: 0 to scale range Default: 0 kg = no alarm
VALVE CYC.LEFT	The ValveCyclesLeft (Refill-Cycle-Count) parameter decrements each cycle. When the ValveCyclesLeft parameter reaches zero, the Valve Cycle Count alarm is posted. The parameter is read/write, so it may be changed by the operator, for example, after servicing the valve seals. Input range: 0 to 999999 Default: 100000 (0 = no alarm)
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1.3.2 <ALARM SETUP sub-menu>

Parameter	Definition
ALARM DELAY [sec] Alarm Delay	Time between the alarm detection and activation of the alarm relay output when the alarm is of the type <Timed> or <Timed-Stop>. The alarm output will not be activated and the alarm will be cancelled if the fault is corrected within this time period. Input range: 0 to 999 seconds Default: 30 seconds.
STARTUP DELAY [sec] Startup Delay	Time during which process related alarm signals are suppressed when the machine is being started up. See section 1.3.1. e.g. Massflow High error is suppressed. Input range: 0 to 999 seconds Default: 60 seconds.
STOP CLRS ALARM Clear Alarm on Stops	Select <Yes> if alarms are to be cleared when a stop occurs. Select <No> if alarms are not to be cleared during a Stop action. Default: No
ALR Number of Selected Alarm	Input of the alarm number, which can be selected from the list in the appendix. With the programming variable ALARM MODE the selected alarm number can be influenced. Input range: See section 2.8
ALR Name of Selected Alarm	Shows the alarm function for the selected alarm number.
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Parameter	Definition
ALARM MODE Selected Alarm Mode	The selected alarm at the variable Alarm number can be influenced as follows: **Setting** — **Definition** IGNORE — Alarm will be ignored. IMMED — Alarm will be activated immediately but ALS output will not change. IMMED-STOP — Alarm will be activated immediately and ALS output switches ON. TIMED — Alarm will be activated after entered startup up- and alarm delays but ALS output will not change. TIMED-STOP — Alarm will be activated after entered startup and alarm delays and ALS output switches ON. Selection will depend upon the action desired.
STOP BY Feeder Stopped By	This message displays what caused the KCM to last stop. • Board Reset (Reset while running) • Loc Display (Stop button on local user interface) • Ext Display (Stop command by host or k-port device) • ALS Input (ALS digital input active) • DginRunEna (Run Enable digital input not set) • Stop Input (Stop edge on digital input) • MDU DrvEna (MDU drive enable input not set ,Term.7-8 & 9-10) • Zero SP (Setpoint zero, shows WAIT status if started) • Emptying (Stopped itself after empty command) • Interlock (Interlock digital input not set, shows WAIT if started) • Calib (Stopped itself after Calib command) • FeedFactBad (Feedfactor bad, runready if FF = 0 and FF ALARM) • MDUInterlock (MDU hard interlock input not set, Term. 11-12) • MDU Alarm (Stopped itself because of a motor alarm)

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1.3.3 Alarm mode actions

- The following chart is important in that it describes the functions of controller outputs and display LEDs under differing alarm conditions.
- Alarm Relay is On for no alarm (fail-safe).
- For Alarm Stop to actually stop the machine, the Alarm shutdown output must be wired to the Alarm Shutdown input.

Alarm Mode	Alarm Display	Alarm LED	ALS Digital Output	Alarm Relay	ASR Bit
Ignore	Off	Off	Off	On	On
Alarm - Immediate	On	On-blinking	Off	Off	On
Alarm - Timed	On	On-steady during time-out On-blinking after time-out	Off	Off after time-out	On
Alarm Stop - Immediate	On	On-blinking	On	Off	On
Alarm Stop - Timed	On	On-steady during time-out On-blinking after time-out	On after time-out	Off after time-out	On

Table: 1 Alarm mode function

1.4 <TUNING menu>

This menu programs the tuning parameters for the application.

Parameters marked ** are only displayed when <METHOD> = <Manual>.

Parameter	Definition
PERT VALUE Pert Value	Pert Value shows the signal/noise ratio of scale disturbance in percentage to the setpoint. It is a measure of scale disturbance relative to setpoint. A low reading is best. If Setpoint is <0>, then the reading is in grams. See appendix for details of using this value to determine feeder performance. Input range: Read only
METHOD Method	If not set to Manual, tuning parameters <CTRL GAIN> and <DISPLAY FILTER> will be set automatically based upon the level of aggressiveness selected. A selection of <Slow> results in slower control response. A selection of <Very Aggressive> results in rapid control response. Select the tuning method that suits to your process. Selecting <Manual> permits the viewing of <ADAPT GAIN>, <SFT CUTOFF>, <SAMPLE TIME> and setting of <ADAPTIVE TUNE>, <DISPLAY FILTER> and <CTRL GAIN>. Selections: Manual, Very Slow, Slow, Moderate, Normal, Aggressive, Very Aggressive Default: Aggressive
DISPLAY FILTER** Display Filter**	Input of the time over which the mass flow display is determined. The greater the value the smoother the massflow display reading. This value has no effect upon feeder control response. Input range:0 to 999 seconds Default: 30 seconds
CTRL GAIN-[%]** Motor Control Gain**	The control loop response amplification factor that determines the control signal for the motor controller. A value of 30 is recommended for most applications and is considered fairly aggressive control. **Setting** **Reaction** **Consequence** Large value 100 Control very active Risk of oscillations great Small value 10 Control less active Risk of oscillations low Input range: 1 to 100% Default: Depends on <Method>

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Parameter	Definition
ADAPTIVE TUNE** Adaptive Tuning**	When set to <On> automatically sets the values of <SAMPLE TIME>, <SFT CUTOFF> and <ADAPT GAIN> for optimal gravimetric feeding performance. <On> is recommended! Input range: On or Off Default: On
ADAPT GAIN-[%]** Adaptive Gain%**	This value represents the amount of gain, as a product with the Control Gain, that is used to set control loop response. If <ADAPTIVE TUNE> is <On>, the value is calculated according the scale disturbance in ppm/Update, the entered setpoint and the scale range. This value is a multiplier for the <CTRL GAIN>. 100% = good control, 10% = poor control. Self Tuning: On The adaptive gain will automatically adjust to give the best gravimetric performance. – Value depends on the weight sample quality – High value = good quality feeding (small massflow deviations) Self Tuning: Off – Value is fixed and can be changed manually. – Increase value = more responsive control. – Lower PERT Threshold Input range: 1 to 100% Default: 100%
SAMPLE TIME- [msec]**) Weight Sample Time**	Setting of the SFTs' measuring cycle in milliseconds. The weight loss is measured using this time interval during feeding. When the <ADAPTIVE TUNE> is <On>, this value is automatically set. This value can only be manually set when <ADAPTIVE TUNE> is <Off>. Input range: 80 to 8,000 msec. Default: 160 msec.
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Parameter	Definition
CUTOFF FRQ-[Hz]** SFT CutOff Frequency**	Cutoff frequency for the SFT internal digital filter. A lower value represents a more stable weight display albeit slower control response. When the Adaptive Tuning is <On>, this value is automatically set. User can change this entry when Adaptive Tuning is <Off>. Self Tuning: On – Setting is dependent on setpoint. On small setpoint values, it will be reduced towards 0.033 Hz. Self Tuning: Off – Value is fixed and can be changed manually – Value may not be greater than 0.4 Hz for normal operation but may go as high as 2 Hz during refill. – Increasing value, increases control response and control is more sensitive to weight disturbance. – Decreasing value, makes the massflow more stable and control slower to respond (more sluggish). Example: Expected response time to gross weight reading after a weight step change. • SFT Cut-Off 0.4 Hz = 2.5 seconds • SFT Cut-Off 0.1 Hz = 10 seconds Input range: 0.033 Hz to 9.999 Hz Default: 0.4 Hz
SPEED MODULAT Modulation or Speed Modulation **Note:** Not for vibratory feeders	If <Gear Reduction> input > 0.00, the screw modulation can be activated. Used only for single screw feeder types. Operating screw speed needs to be below 60 rpm for modulation to work. Input range: On or Off Default: Off **Notes:** • This parameter is displayed at the KSU-II/KCM only if the proper motor drive is installed and the proper gear reduction is entered. This parameter is not used for vibratory drives. • An incorrect input of <Gear Reduction> leads to the oscillation.
SETPT CHG LIM Vibratory SP **Note:** Vibratory feeders only	Defines control behavior during setpoint changes when a vibratory feeder is used. If the setpoint change exceeds the input value, the behavior is executed on the basis of the calculated calibration curve. See FF@%DC in the <CALIBRATION menu>, <FEEDFACTOR sub-menu>. Input range: 0 to 100% of the entered Setpoint Default: 10%.

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Parameter	Definition
V-AGIT.PERIOD **Note:** Only active with three load cells	If there is a detectable weight disturbance signal with approximately the same period as the agitator interval time (in seconds), the software algorithm will work to cancel it out. The algorithm self synchronizes around the entered time period. Alternatively the synchronization can be made with an optional digital input from a sensor that delivers 1 impulse per agitator turn. This would be required if the agitator speed is variable.
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1.4.1 Method selection versus tuning parameters table

**The user sets these entries plus <ADAPT TUNE> to <On, Off>.

Setting	Display Filter Seconds	Ctrl Gain
Manual	**	**
Very Slow	120	2.0
Slow	90	4.0
Moderate	60	8.0
Normal	45	15
Aggressive	30	30
Very Aggressive	20	50

1.4.2 Pert values and control response

The Pert Value shows us the noise condition of the net weight even if the self tuning is off and the feeder is stopped. This is called net weight quality.

Pert Value shows the signal/noise ratio in percentage to the setpoint.

Please refer to the next table to determine system performance.

Pert Value	Control Action/Response	Adaptive Gain
0-33%	Very good control response	80%
33-67%	Good to fair control response	50%
67-100%	Fair to poor control response	20%
100-250%	Very poor control action	10%
Over 250%	Most likely no control	

Be aware on accuracy tests the massflow results from the reference scale and feeder can deviate.

Reasons for massflow deviation may include:

- Feeder measures the product flow and the noise (e.g. Side wind on hopper, vibration at the scale, wiring contact, pressure and vacuum effects)
- Reference scale measures only the product flow without the noise.

1.5 <REFILL Menu>

This menu allows easy refill set-up.

Parameter	Definition
REFILL Refill Enable	Enabled Setting for automatic refill. The net weight alarm limit is active. Disabled The feeder hopper can be emptied without refilling being triggered. The net weight alarm limit is disabled. If Running If <Running> is selected, refill is only enabled when the feeder runs, otherwise it is disabled. Default: Disabled
REFILL MAX. Refill Level Maximum	Input of the upper refilling limit at which refilling is stopped. See section 1.5.1 for more information. **Warning:** Do not exceed the hopper capacity or scale capacity when entering the top refilling limit. Input range: < 0.95 x Gross scale Default: 0.06 kg
REFILL MIN Refill Level Minimum	Input of the lower refilling limit at which refilling is started. See section 1.5.2 for more information. **Warning:** Feeding behavior can be affected if the refilling limit is set too low. Do not uncover feeder horizontal agitator. Input range: < Refill Maximum Default: 0.05 kg
POST REFILL DELAY Post Refill Vol/Grav Delay	Delay time before the feeder switches back to gravimetric mode after the refill turns off. See section 1.5.3 for more information. Input range: 0 to 240 secondsDefault: 10 sec.
REFILL MODE Refill Mode	Selections: Auto, AutoTerm, Man This entry controls how the refill is executed and particularly what occurs if a refill failure happens. Use <Auto> for automatic refill systems else use <Man> for LWF hoppers that are refilled by hand. AutoTerminate allows the refill device to shut off if a refill fails. See section 2.2 for more information. Default: Auto

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Parameter	Definition
VALVE DELAY	This Entry is used to activate the refill complete target software. The exact time of closing the <Refill> output signal varies automatically based on the "as measured" refill rate and the parameter ValveDelayTime to avoid over filling the feeder. A higher refill rate turns off the refill window output bit sooner to prevent overfill. The parameter ValveDelayTime is the time in milliseconds that it takes the valve to actually close plus the time the material falls. Input range: 0 to 9999 msec. Default: 0 msec.
FLT CLEAR TM Blow Off Time	Time in milliseconds to provide a pulse to use for a filter clearing function on a vacuum loader or a jet filter. A digital output must be assigned for <BlowOff>. Not for HCU controlled loaders. Long Blow off times are divided up automatically to get more forceful air blasts by pausing to let the air accumulate. 100 = 1 pulse 100ms 102 = 2 pulses, 100ms on, 100ms off 505 = 5 pulses, each 500ms on and 500ms off. 525 = 5 pulses, each 500ms on and 2 sec off. 1053 = 3 pulses, each 1000ms on and 5 sec off. Input range: 100-9999 msec. Default: 1000 msec.
MIN OPEN TIME	This Entry is used to set the minimum refill valve open time. This is used when refilling needs a pneumatic flow aid or filter clean pulse that causes a weight spike which stops refill by mistake.
REFILL ARRAY Feedfactor Array or Density Array	ON — Refilling feedfactor storage array is on. The feeding factor values are stored in these registers when the gravimetric mode is active. During refilling, the stored feeding factor values in conjunction with setpoint are used to establish proper drive command. OFF — The refilling feedfactor storage array is off. The last average feedfactor just prior to refill is used in conjunction with setpoint to control feeding during refilling. Input range: On or Off Default: Off **Notes:** • When <ON>, the Refill Array routine checks that the array FF Empty and FF Full are within 0.5 to 2.0 times the current average feed factor, otherwise the FF array is cleared. • If the feed factor changes more than 15% (0.5 times the service variable RefArr DevLim), the refill array is cleared.

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Parameter	Definition
FEED FACT 1, 5, 9 FF Hopper Full FF Hopper Mid FF Hopper Empty	Display of the feeding factor values in the refilling feedfactor array. These factors are calculated in the gravimetric mode and used during refilling in the volumetric mode when the refilling array registers are activated. Full(9) = 10% below the top refilling limit. Middle(5) = 50% below the top refilling limit. Empty(1)= 10% above the lower refilling limit. Input range: Display only [MF@100%DC] **Note:** Consistency of values indicate little variance in bulk material flow properties. This is ideal. Rapidly changing bulk density can affect feeder performance over the refill range. This would be evidenced by widely varying values of feedfactor. If the values vary highly, consider modifying refill levels, both maximum and minimum, to achieve more consistent feedfactors over the refill range.
Table page 3 of 3	

1.5.1 Setting the Refill Max value

1. Select the <REFILL menu>.
2. Select <REFILL MAX> parameter.
3. Enter a suitable value.
4. Execute a refill to verify that the scale does not over-range or that material does not back-up into the hopper in-feed port.

1.5.2 Setting the Refill Min value

1. Select the <REFILL menu>.
2. Select <REFILL MIN> parameter.
3. Enter a value that is = 0.4*REFILL MAX value.
4. Execute a refill to verify that the horizontal agitator if the feeder is so equipped, is not uncovered at any time. Adjust the value if necessary.

It is important that the horizontal agitator does not become uncovered during normal operation as it may affect feeder performance.

1.5.3 Setting the Post Refill Delay

Only adjust this value if the feeder is unstable (noted by highly varying motor speed) immediately after a refill.

1. Select the <REFILL menu>.
2. Select <POST REFILL DEL> parameter.
3. Enter a value that is twice the entered value.
4. Execute a refill to verify that motor speed is now quite stable immediately after a refill. If not, repeat step 3 until a stable exit from refill is achieved.

Don't exceed 30 seconds for <POST REFILL DELAY> unless otherwise advised.

1.5.4 Setting the Refill Timer

Refill timer set-up equipment required:

Stop watch

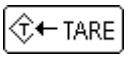
Refill timer set-up procedure:

1. Execute a refill
2. Start a stop watch when the refill begins
3. Stop the stop watch when the refill is compete and the discharge device stops discharging product.
4. Select the <ALARM menu>.
5. Select the <ALARM LIMITS sub-menu>.
6. Select <MAX REFILL TIME> parameter.
7. Enter a value =1.25* the stop watch value.

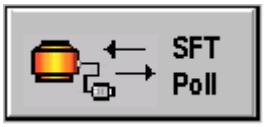
1.6 <SCALE menu>

This menu programs the scale parameters and SFT operation.

1.6.1 <GENERAL sub-menu>

Parameter	Definition
TARE Tare Weight	Weight of the feeder with no material. This value will set automatically when Auto Tare function is executed. Input range: 0 to scale range [kg]
AUTO TARE	This command allows the current weight value to be entered into the TARE memory when the product hopper is empty. ⇒ For KSU-II/KCM select parameter then press  ⇒ For KSL press **F5-MORE** then  ⇒ For KSC press 
SPAN Weight Span	Input of the span correction factor for fine compensation of mechanical scale weighing errors. This value may automatically change if the Auto Span feature is used in the <CALIBRATION menu>. Input range: 0.4 to 2.5 Default: 1.000
NET WEIGHT Net Weight	Display of the current weight of the feeding material on the scale. Net weight = Gross Weight - Tare Range: Display only 0 to scale range [kg]
GROSS WT Gross Weight	Display of the current total weight of the feeder and feeding material on the scale. Range: Display only, 0 to scale range [kg]
SCALE RANGE Scale Range	Input of the scale's nominal capacity.This value will be read automatically from the connected load cell (s). If an mechanical reduction is used (e.g. B3 weighing bridges) enter the new weighing range with the service variable Scale Range. Range: read only

1.6.2 <SFT sub-menu>

Parameter	Definition
SFT REQUIRED Number of SFTs Required	Input of the number of connected SFTs. Input <1> for single point weighing system e.g. K-SFS or D5 scale or <3> for a three SFT weighing system. Input range: 0 to 6
REPOLL	This command will cause the controller to execute a poll on the weight/internal channel to locate connected and operational SFTs by address. ⇒ For KSU-II/KCM select this parameter and press ENTER twice. ⇒ For KSL press Poll ⇒ For KSC press 
AUTO READDRESS Not on KSL/KSC	This parameter allows SFTs to be auto-readdressed automatically. See section 1.6.3 for more information. ⇒ Press ENTER .

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Parameter	Definition
SFTs SFT Configuration	The addresses and error signals of the connected weighing cells are displayed.Typically the parameter will appear as: <-1-------D> or <-123-----D>. The number representing the address of the SFT. Other codes in place of the SFT address include: ? = Invalid response from SFT. -- = No SFT at this address. t = SFT no longer responds. Weight channel data communication failure. f = Internal failure in the SFT, replace SFT. C = EPC address. D = MDU address. E = HCU / LSR address. F = ActiFlow address. G = Second MDU drive address. For a new initialization of the display press **ENTER** twice at the variable <REPOLL>. Input range: Display only
SFT SELECTED Node # Of Selected SFT	Selects the SFT to query parameters: SFT #, SFT SN#, SFT ADDRESSED, SFT WEIGHT, SFT TYPE, SFT STATUS. Input range: 0 to 11
SFT ADDRESSED SFT Addressed	Switching <Off> will address the selected SFT to <0>. Switching <On> sets the SFT address selected in the SFT SELECTED program parameter if there is an available spare SFT. Input range: On or Off
SFT WEIGHT SFT Weight	Displays the current gross weight on the selected SFT. Input range: Display only
SFT TYPE SFT Type	Displays the type of the selected SFT. Input range: Display only
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Parameter	Definition
SFT STATUS SFT Status	SFT error display. The <Process Status Word> of the selected SFT is displayed. Any status word except 00000183 or 00000181 indicate SFT failure. For more informations see chapter 2.4.6. Input range: Display only
SFT # SFT Software	Display of the software version of the selected SFT. Input range: Display only
HW #	Display of the hardware version of the selected SFT. Input range: Display only
SFT SN # SFT Serial # (Number)	Reports the serial number of the selected SFT.
SFT TEMPERATURE SFT Temperature	Indicates the SFT's internal temperature, in degrees Celsius, of the selected SFT, if the SFT software supports this display parameter.
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1.6.3 SFT Addressing

SFT version 'S' and later version SFTs, have special means to allow readdressing of individual SFTs with the same address. These are:

- A command to poll and identify SFT's with the same address based on their serial number.
- A command to change the address of a SFT also based upon serial number.

Terminology:

- New SFT: software version = 'S' or later
- Old SFT: software version 'N' to 'R'
- Note: SFT version 'M' (1st FAST SFT 1997) will not automatically address since they have no means to change the address 'on the fly'
- Spare SFT: SFT has address <0>
- Poll: Polling the internal channel address 0 to 12 to see on which address any connected SFT responds
- Auto Address: Automatically change the address of a Spare SFT to the next available address
- Auto Readdress: Automatically readdresses all SFT's from 1 to n

Auto addressing rules:

- Auto addressing takes place on power-on with a present spare SFT on address 0.
- If an SFT is found on address 0, it gets readdressed to the next available address.
- If one or more new spare SFT's are found on address 0, they get readdressed to the next available address.
- A single SFT on any address > 0 stays at the same address after addressing.
- If there are several SFT's occupying the same address, these SFT's get addressed to the next available address.
- If an old SFT is found together with new ones on the same address, the new ones get readdressed, the old one stays at the same address.

Auto readdressing by user command only rules:

The rules are the same as for auto addressing but:

- All new SFT's get readdressed to 1, 2, 3 … n where the old SFT's will stay on their current address.
- SFT's get addressed in the order they are found. Thus, if there is no conflict and the addresses are 1…n, the final addresses will be the same as before.

1.6.4 Manual addressing of SFTs

To set the address of a newly installed SFT to a prescribed address, follow the next procedure.

1. Select <SCALE menu>, <SFT sub-menu>.
2. View SFTs variable to verify the SFT in question is at address <0>.
3. Select <SFT SELECTED>.
4. Enter the new SFT address.
5. Select <SFT ADDRESSED>.
6. Select <On>.
7. View SFTs variable to verify the SFT is now at the desired address.

To manually change the address of a properly installed SFT to a new defined address, follow the next procedure.

1. Select <SCALE menu>, <SFT sub-menu>.
2. View SFTs variable to verify the SFT address to be changed is present.
3. Select <SFT SELECTED>.
4. Enter the SFT address seen from step 2.
5. Select <SFT ADDRESSED>.
6. Select <Off>.
7. View SFTs variable to verify the SFT address is now <0>.
8. Select <SFT SELECTED>.
9. Enter new SFT address.
10. Select <SFT ADDRESSED>.
11. Select <On>.
12. View SFTs variable to verify the SFT is now at the desired address.

1.6.5 <PRESSURE COMP sub-menu>

Displayed only when electronic pressure compensation (EPC) is connected.

Parameters	Definition
PRESS WGT.	Pressure Weight (float read only) This parameter gives the calculated correction to the Net Weight based on one or both pressure sensors.
ZERO PRESSURE	Command to tare the EPC pressure. When the system is open to atmosphere, the displayed pressure is zero, or near zero.
PRESS HOPPER	Pressure in mBar of the Hopper Pressure sensor.
HOPPER AREA	This parameter is the area of the refill opening plus the vent opening. A value > 0.0 enables the sensor function and alarm. Use the sum of the two areas if each is isolated by a flexible bellow and the other side of the flexible bellow is closed. A vent opening covered with a filter sock does not count, but a vent opening isolated by a flexible bellow with a bin-vent type jet-pulse filter on the other side of the flexible bellow does count.
HOPPER SPAN	This parameter is an adjustment of the Pressure Weight correction based on the Hopper Pressure and the Hopper Area. The self tuning changes this parameter.
HOPP.MAX ALRM	This parameter is the alarm limit on the hopper pressure. If the hopper pressure exceed this limit, the KCM will post an OverPressure alarm.
PRESS DISCH	This parameter gives the pressure in mBar of the Discharge Pressure sensor.
DISCH AREA	This parameter is the area, in square meters of the vertical outlet opening. A value > 0.0 enables the sensor function and alarm. Use the area if it is isolated by a flexible bellow and the other side of the tube is closed. If the other side also has a flexible bellow (mechanical compensation), do not use a sensor and leave the area 0.0.
DISCH SPAN	This parameter is an adjustment of the Pressure Weight correction based on the Discharge Pressure and the Discharge Area. The self tuning changes this parameter.
SENSOR RANGE	Range of the pressure sensors. The usual pressure sensor will be +/- 50 mBar. Therefore enter 100 mBar as the range.

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Parameters	Definition
AUTOSPAN TIME	Default Value = 0 (zero). Available for LWF only. This parameter controls the self-tuning of the two Pressure Span values. If the AutoSpan Time is less than 100 seconds, then self-tuning of the two span values is disabled and the two span values will remain locked in at their current values. If the AutoSpan Time parameter is 100 seconds or more, the self-tuning of the span values is enabled. The longer the AutoSpan Time is, the slower and smoother the span values will change. The adjustment of the spans is limited between 0.8 and 1.25. An expected AutoSpan Time for a new system might be 500 to 1000 seconds. After the Span values settle (after an hour or two) you can either turn off self-tuning by setting the AutoSpan Time to zero, or else set the AutoSpan Time to a much longer time, like 2000, to get only very slow updates. The maximum AutoSpan Time is 9999 seconds. It is recommended to leave the auto-span time non-zero because the spans can change dynamically due to imperfect mechanics like misaligned flexible bellows and the like.
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1.7 <MACHINE SETUP menu>

This menu programs the feeder specific information.

1.7.1 <GENERAL sub-menu>

Parameter	Definition
SETPOINT MODE Setpoint Mode	**Setting** — **Meaning** LOCAL — Feeder is operated as an individual unit. RATIO — Percentage of an external analog setpoint input = operating setpoint. DIRECT — External analog setpoint input = operating setpoint. LINE1-8 — Feeder Setpoint is entered from the Line overview Page. In this mode the feeder is assigned to a line. It's called recipe mode. Use Line1 for KSL. Input range: See list Default Local
MAX SETPT Maximum Setpoint	Input of a maximum permissible setpoint value. This value depends on the maximum throughput performance of the feeder. Input range: 0 to 999999 kg/h Default: 7200 kg/hr. **Note:** This value also scales the ratio setpoint input and massfow and setpoint analog outputs.
SP RAMP INC	Input of the setpoint ramp rate. Input range: 0 to 1000 kg/h Default: 10 kg/hr.
UNITS Units Selection	Selection of the desired units. **Setting:** kg/h, kg/min, lb/h, lb/min, T/h (metr. Ton), ET/h (engl. Ton), gr/h, gr/min. Input range: See list Default kg/h **Note:** This selection change automatically all weight specific units.
RUN TIME-[hours] Feeder Run Time	Display of the total run time in hours. A value may be entered as a baseline. Input range: Normal Display only

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Parameter	Definition
FDR ADDR Feeder Number or Feeder Address	Address of the selected KCM. Input range: 1...31 **Notes:** • If the KCM CPU DIP switch, positions <1> to <5> are all set to <0>, then the feeder address is set by this entry, else it is from the DIP switch and then this parameter is 'read only'. • The KCM address can also be set based on digital inputs.
APPLICATION Control Type or Application Type	Input of the application type: **Selection:** LWF, WBF, SFM, PID, VOL, LWB, WBB, SFB, XTR, Confirm, GWB Input range: See list Default: LWF
LANGUAGE Only in KSU-II/KCM	Selects the desired language for the Display. Input range: English, German, French, Spanish, Italian and Custom. Default: English **Note:** For more informations see chapter 1.7.2
SCREEN SAVER Only in KSU-II/KCM	When set to <On> activates the KSU-II and KCM screen saver function. Input range: On or Off Default: On
Feeder Name Only for KSL	Enter feeder name at KSL only.
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1.7.2 Loading language file

- The following languages are supported without loading any external files: English, Deutsch, Spanish, French and Italian. If you pick "Custom" as the language, you will need to download the language file.
- It is important to erase any previous file before downloading a new one since it will not overwrite an existing file.
- The following language files are available: Chinese, Japanese, Korean, Danish, Polish, Portuguese, Russian and Turkish.

1. To load the language file to the KCM, switch parameter SYSTEM - COMMUNICATION - CONFIG MODE to "Diag".
2. Connect the PC with a null modem cable to the config port and run a terminal program like Windows HyperTerminal with 19200, 8, n, 1.
3. Press enter on the PC to start the interactive menu. Next press "2" to select Flash File Information,
4. Press "4" to erase the previous file and "y' to confirm the erase.
5. Press "3" to download the file, then load the file with Z-Modem from HyperTerminal.

1.7.3 Changing feeder control application type

To change the feeder from one application type to another, perform the following procedure.

1. Select <APPLICATION>
2. With **NEXT,** select the desired new application like <WBF>.
3. Press **ENTER**.
4. Press **ENTER** again or wait for the parameter <APPLICATION> to again appear.
5. Select <Confirm>
6. Press **ENTER** to load new application.

1.7.4 KSU-II/KCM screen saver description

The screen saver is used to protect the screen from burning out when always the same data is shown. The screen saver is based on the parameter <MACHINE SETUP menu>, <GENERAL sub-menu>, <SCREEN SAVER> parameter to <On/Off>. The value On or Off is held in the KSU-II EEPROM. This allows to program each KSU-II individually to have the screen saver on or off. The default value is On.

The screen saver functions as follows:

1. After setting the screen saver to ON or in case it is already ON whenever a key is entered, a 12 hour timer starts to count down.
2. If the 12 hour timer has counted down to 0, the screen is set to its lowest brightness level. The screen data displayed is unchanged. The 12 hour timer restarts.
3. If the 12 hour timer has counted down again to 0, the KSU-II is set to the Home page and the screen is cleared. A screen saver character (all pixels on) moves smoothly through each character position line by line. When it reaches the last character position it restarts on the first top left position.
4. When the screen saver is in state 2 or 3 above, any key entered in the keypad will restore the screen to the normal brightness and screen data. The 12 hour timer restarts.

1.7.5 <MOTOR sub-menu>

Some parameters will not be displayed for every drive case.

The <MOTOR sub-menu> is shown for following types of drives.

- DC drives 450 and 1600 watts
- AC VFD
- AC interface
- Vibratory drive
- Stepper motor drive in three versions

1.7.6 <MOTOR sub-menu> for DC drive

Parameter	Definition
GEAR REDUC Gear Reduction or Total Gear Reduction	This parameter is used if the Screw Modulation or the Auto Gear Reduction functions are used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the lowest reduction or simply provides the highest screw speed for any given motor rpm. Input range: 0 to 999 Default: 0
GEAR REDUC L Gear Reduction Low	This parameter is used if the Auto Gear Reduction function is used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the highest reduction or simply provides the lowest screw speed for any given motor rpm. This entry is checked against the GEAR REDUC value to be sure that the magnitude of the entry is correct. Input range: 0 to 999 Default: 0
PICK UP TEETH Speed Pickup Teeth	Input of the number of teeth on the pick up gear. This gear is used for measuring the speed. Input range: 0 to 9999 Default: 120 **Note:** with Pick up teeth set to zero is it possible to run the KCM without Pick up. Only valid with the 450W board hardware version 7405-E and later.
MOTORLOAD ACT Actual Motorload	Displays the actual motor load. Input range: Display only [%]
MAX. MOT POWER [watts] Max Motor Power	This entry sets the maximum output power to the motor. (See nameplate on motor for value) Input range: 25 to 1600 W Default: Depends upon installed drive

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Parameter	Definition
MAX POWER LOW [watts]	This entry sets the maximum output power to the motor for low gear or when two different Motors are used. (See nameplate on motor for value) Input range: 0 to 450 W Default: 0
MAX MOT VOLTAGE Motor Voltage	This entry sets the maximum output voltage to the motor. (See nameplate on motor for value) Input range: 90 to 220 VDC Default: 180 VDC
MAX MOT SPEED - [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific. Default: drive specific (See nameplate on motor for value)
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.1.
DC CEILING-[%] Drive Command Ceiling	Limitation of the drive command output to the motordrive. Input range: 10 to 125% Default: 110%
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1.7.7 <MOTOR sub-menu> for AC VFD

Parameter	Definition
GEAR REDUC Gear Reduction or Total Gear Reduction	This parameter is used if the Screw Modulation or the Auto Gear Reduction functions are used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the lowest reduction or simply provides the highest screw speed for any given motor rpm. Input range: 0 to 999 Default: 0
GEAR REDUC L Gear Reduction Low	This parameter is used if the Auto Gear Reduction function is used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the highest reduction or simply provides the lowest screw speed for any given motor rpm. This entry is checked against the GEAR REDUC value to be sure that the magnitude of the entry is correct. Input range: 0 to 999 Default: 0
PICK UP TEETH Speed Pickup Teeth	Input of the number of teeth on the pick up gear. This gear is used for measuring the speed. Input range: 0 to 9999 Default: 120 **Note:** with Pick up teeth set to zero is it possible to run the KCM without Pick up. Only valid with the 450W board hardware version 7405-E and later.
MOTORLOAD ACT Actual Motorload	Displays the actual motor load. Input range: Display only [%]
MOTOR	Motor type setting. Input range: Manual, Baldor ½ hp,Y602 ½ hp (Marathon motor), Baldor 2 hp, EMWB 450W, EMWB 1600W, AKM43H (Kohlmorgan servo motor for Pharma Feeder), B56H5Q (Lafert servo motor for Pharma feeder in Hazardous locations) Selecting <Manual> permits the viewing of <PAR.SELECT> and <PAR.VALUE> for the input from the motor data.

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Parameter	Definition
PAR.SELECT **Note:** These parameters are only needed if a CUSTOM ac motor is used. Using one of the motors from the selection list means, all of these parameters are automatically filled in with correct defaults	The motor characterization parameters in the mini-loop. FLCurrent[A] (Full load motor current in Amps) MagCurrent[A] (Motor's magnetizing current in Amps) RatedFreq[Hz] (Motor's rated frequency in Hz) MaxFreq[Hz] (Maximum frequency used by KCM Hz) MinFreq[Hz] (Motor's rated minimum frequency in Hz) OverCurrent[%] (programmable shutdown limit in% of Full Load Current) OCurrTime[s] (programmable shutdown limit in seconds) OverCurr2[%] (programmable shutdown limit#2 in% of Full Load Current) OCurrTime2[s] (programmable shutdown limit#2 in seconds) Inertia[pu] (total inertia of motor plus load in internal units) X1[Ohms] (Motor Impedance X1 parameter in Ohms) X2[Ohms] (Motor Impedance X2 parameter in Ohms) Xm[Ohms] (Motor Impedance Xm parameter in Ohms) R1[Ohms] (Motor Impedance R1 parameter in Ohms) R2[Ohms] (Motor Impedance R2 parameter in Ohms)
PAR.VALUE	Value for the selected parameter.
MAX. MOT POWER [watts] Max Motor Power	This entry sets the maximum output power to the motor. (See nameplate on motor for value) Input range: 25 to 1600 W Default: Depends upon installed drive
MAX POWER LOW [watts]	This entry sets the maximum output power to the motor for low gear or when two different Motors are used. (See nameplate on motor for value) Input range: 0 to 450 W Default: 0
MAX MOT VOLTAGE Motor Voltage	This entry sets the maximum output voltage to the motor. (See nameplate on motor for value) Input range: Read only Default: 230 VAC
MAX MOT SPEED - [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific. Default: drive specific (See nameplate on motor for value)
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.1.

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Parameter	Definition
DC CEILING-[%] Drive Command Ceiling	Limitation of the drive command output to the motordrive. Input range: 10 to 125% Default: 110%
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1.7.8 <MOTOR sub-menu> for AC Interface

When no speed sensor is available then program the <PICK UP TEETH> to zero

Parameter	Definition
GEAR REDUC Gear Reduction or Total Gear Reduction	This parameter is used if the Screw Modulation or the Auto Gear Reduction functions are used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the lowest reduction or simply provides the highest screw speed for any given motor rpm. Input range: 0 to 999 Default: 0
GEAR REDUC L Gear Reduction Low	This parameter is used if the Auto Gear Reduction function is used. This entry must be the total reduction value between the drive motor and the feed screw. This entry is the highest reduction or simply provides the lowest screw speed for any given motor rpm. This entry is checked against the GEAR REDUC value to be sure that the magnitude of the entry is correct. Input range: 0 to 999 Default: 0
PICK UP TEETH Speed Pickup Teeth	Input of the number of teeth on the pick up gear. This gear is used for measuring the speed. Input range: 0 to 9999 Default: 120
MAX MOT SPEED - [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific. Default: drive specific (See nameplate on motor for value)
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.1.
DC CEILING-[%] Drive Command Ceiling	Limitation of the drive command output to the motordrive. Input range: 10 to 125% Default: 110%

1.7.9 Using an external motor drive

The CPU outputs 0-20 mA only.

1. The AC Interface is installed.
2. In the <I/O SETUP menu> <ANALOG OUTPUT sub-menu>, set the following:
   – <ANALOG NUM>: <CPU>
   – <FUNCTION>: <Drive Command>
   – <DEADBAND>: <0.25>
   – <AOUT MAX>: 100% (This is the output span value)
   – <AOUT MIN>: 20% (This is the offset value)
3. Make the wiring connects per the provided drawing.
4. Run the feeder in volumetric control
5. Adjust <Aout Max> to get the desired motor speed for a given value of drive command.

1.7.10 <MOTOR sub-menu> for vibratory drive

Parameter	Definition
KV DEVICE Vibratory Type	Selection of the used Vibratory type. KV1=1, KV2=2, KV3=3. Input range: 1,2,3 Default: KV2=2
VIB SPAN Vibratory Displacement Span	Span adjustment for vibratory tray displacement. The displacement must be measured at the vibratory and the SPAN calculated according following formula: NewSpan = OldSpan x ((Expected_Displacement)/(Measured_Displacement)) Input range: 0.5 to 2.0 Default= 1.000
VIB DRIVE%	
VIB FREQ Hz	
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.4.
DC CEILING-[%] Drive Command Ceiling	Limitation of the drive command output to the vibratory drive. Input range: 10 to 125% Default: 110%

1.7.11 <MOTOR sub-menu> for universal stepper motor

- Some parameters will not be displayed for every drive case. This section is used for stepper motor driven feeders. A chart of stepper motor sizes will be provided to aid in proper programming.
- The following chart is provided to program the universal stepper drive 0000005987 only.

Parameter	Definition
GEAR REDUC Gear Reduction or Total Gear Reduction	This parameter, if entered as the gear reduction value between the stepper motor and the disk/screw, results in the disk/screw speed being displayed in the parameter <SCREW SPEED>. Input range: 0 to 999 Default: 0
PICK UP TEETH Speed Pickup Teeth	Input of the number of pulses per revolution of the optical encoder. This encoder is used for measuring the speed. Input range: 0 to 9999 Default: 400
MOTORLOAD ACT Actual Motorload	Displays the actual motor load. Input range: Display only [%]
MAX. MOT POWER [watts] Max Motor Power	This entry sets the maximum output power to the stepper motor. (See nameplate on motor for this value, then use table 1.7.13 to set power.) Input range: 25 to 194 W Default: Depends upon drive
MACHINE	Machine type setting. Programs the <MAX.MOT POWER> automatically. Input range: MT12(38W), Micro12/16, BSP150, BSP135, BSP125, BSP100, ConeFD Default: MT12(38W)
MAX MOT SPEED [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific. Default: drive specific (See table 1.7.13 for values)
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.1.
DC CEILING [%] Drive Command Ceiling	Limitation of the drive command output to the motordrive. Input range: 10 to 125% Default: 100%

1.7.12 <MOTOR sub-menu> for HiPo, LoPo Stepper motor

This chart is used to program the HiPo and LoPo stepper drives, part numbers 0000004568 and 0000001430 respectively.

Parameter	Definition
GEAR REDUC Gear Reduction or Total Gear Reduction	This parameter if entered as the gear reduction value between the stepper motor and the disk/screw, results in the disk/screw speed being displayed in the parameter <SCREW SPEED>. Input range: 0 to 999 Default: 0
PICK UP TEETH Speed Pickup Teeth	Input of the number of pulses per revolution of the optical encoder. This encoder is used for measuring the speed. Input range: 0 to 9999 Default: 400
MAX MOT SPEED - [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific. Default: 60 (See table 1.7.13 for values)
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.1.
DC CEILING-[%] Drive Command Ceiling	Limitation of the drive command output to the motordrive. Input range: 10 to 125% Default: 100%

1.7.13 Stepper motor programming table

- Stepper motor mounted optical encoder provides 400 pulses per revolution-quadrature.
- For BSP150-S, use a gear reduction of 2.00.
- This list may change. Review stepper motor label before selecting stepper drive and programming.

Feeder Type	Max Motor RPM	Maximum Power Setting-W	Required Stepper Drive
BSP100	60	49	0000001430 0000005987
BSP135	60	194	0000004568 0000005987
BSP150-S	120**	194	0000004568 0000005987
KM-T12	150	43	0000005987 0000001430

1.7.14 <SERVICE SETUP sub-menu>

Parameter	Definition
S.VAR Service Variable Function	Display of the service variable name. See list in the appendix see section 2.5.
S.VAR VALUE Service Variable Value	Display and change of the service program value as selected with S. VAR.

Table page 1 of 3

Parameter	Definition
TRACETICK Tracetick	This parameter sets the time interval for recording operating data to KCM internal memory so that it can be retrieved and viewed on a PC for later analysis. Two types of data are recorded: Trace data e.g. massflow and operational status. e.g. gravimetric control. The second data type recorded is Alarm History data. Selections: Stop: The trace recording is stopped and the data can be read from the Configuration serial data port using HyperTerminal. When <Stop> is selected, the data can be read from the KCM at any time as long as power to the KCM is not interrupted. Restarting of the <TRACETICK> can be done without losing data if done within 1 hour of stopping the trace. <1 sample>: Each sample point of data is recorded. No more than five minutes of data can be stored without older data being over-written. <1/4 Sec>: 4 samples per second of data <1 Sec>: 1 sample per second of data <5 Sec>: 1 sample of data every 5 seconds <15 Sec>: 1 sample of data every 15 seconds <60 Sec>: 1 sample of data every 60 seconds <1 SmpRun>: Each sample point of data is recorded. No more than five minutes of data can be stored without older data being over-written. Only when the feeder is running <1/4 SecRun>: 4 samples per second of data. Only when the feeder is running <1 SecRun>: 1 sample per second of data. Only when the feeder is running <5 SecRun>: 1 sample of data every 5 seconds. Only when the feeder is running <15 SecRun>: 1 sample of data every 15 seconds. Only when the feeder is running <60 SecRun>: 1 sample of data every 60 seconds. Only when the feeder is running <Save to File>: Only for KCM with Web Interface. When changed to <Save to File> the data will be sent from the KCM to the Ethernet CPU. This process takes approximately four minutes. After four minutes, the data will be available for examination/copy using the browser. Default: 1 second

Table page 2 of 3

Parameter	Definition
TRACETICK Tracetick	**Notes:** • The default value of 1 second will return after a KCM power interruption. Any other value of <Trace Tick> is not stored during a power interruption. • There are 3600 individual samples of data in storage. So for a 1 second timetick, 1 hour of data is preserved. For a 60 second timetick, 60 hours of data are stored.  Please see manual 0690020601 for operational details on using this resource.
STOP ON PSW/ASW	This is the PSW or ASW bit number on which the recording will stop. **Notes:** • <STOP ON PSW/ASW> uses PSW and ASW, not PSR and ASR. • <STOP ON PSW/ASW> number meanings: – 0 = not stop, default, continuous running. – 1…255 PSW bit number that changes the recording to STOP if the status changes (from 1 to 0 or 0 to 1,). – 300…555 PSW bit number, minus 300, that changes the recording to STOP if the status changes from 0 to 1. – 600…855 PSW bit number, minus 600, that changes the recording to STOP if the status changes from 1 to 0. – 1000…1127 ASW bit number, minus 1000, that changes the recording to STOP if it gets active.
Table page 3 of 3	

1.7.15 <PERFORMANCE sub-menu>

Depending upon drive type, certain parameters will not be displayed.

Parameter	Definition
CONTROL-% Control-%	This parameter is a quality indicator of loss-in-weight feeding performance. This value uses the same technique like the pert value calculation in relation to the setpoint where 100% means no noise, 0% means too much noise. If the controller is in volumetric or pert, the value is slowly decreased. A value > 80% means usually a good performance.
GRAV RATIO-% Gravimetric Ratio-%	The time ratio the machine runs in gravimetric mode and has no pert disturbance. The value is filtered with a time constant of 15 minutes. A value of 100% means the feeder is always in gravimetric mode and shows no Pert disturbance while 0% means the feeder is never in Gravimetric mode.
INT CHANNEL-% Internal Channel-%	The internal channel performance is calculated in two parts, the bandwidth load and the error counter where it considers 10 errors per minute as bad and 100% load as bad. Both values are taken in square as follows: IntChanPrf% = 100 * 1 - [(Load² + (0.1*Err/min)²) /2] Example: 5 errors/min and 50% load = 75% performance. Expect normal values of 75% to 99%.
KCM TEMP. [C] KCM Temperature	Displays the actual temperature in the KCM in °C. Input range: Display only.
TORQUE-% Only for DC motor and stepper motor drives Torque-%	The motor torque is derived from the power indication according to the following formula: Torque = 100*(actual power * nominal speed) / (nominal power * actual speed). **Notes:** • On low speeds, this indication might be inaccurate. • 100% torque is the maximum allowed. • Not for vibratory feeders or for AC Interface. • At low speeds, torque will reach a maximum of 100% before <Actual Power> reaches <Maximum Motor Power>. At high speeds, the opposite will occur.

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Parameter	Definition
BRUSH REMAIN-% Brush Remain-% Only for DC motors	The DC motor brush life is estimated according to the following formula: Estimated_Life = Expected_Life * Nominal_Power / Current_Power To indicate the remaining life, the following formula is calculated once per second: Brush_Remain = Brush_Remain - [(100/(3600*5000))*(MotorPower / Nominal_Power)] Where: 100 indicates in percent (3600 * 5000) expected life in seconds (Motor_Power / Nominal_Power) The current power ratio, limited to ≥ 0.1 If the motor is new, one should enter 100% in <BRUSH REMAIN> Also after checking the brushes, the parameter can be modified on the basic of current brush life.
Table page 2 of 2	

1.7.16 <AGITATOR sub-menu> ONLY for AC VFD motor drive type

Parameter	Definition
MDU STATUS MDU Status	The MDU status codes reveal operational condition of the Drive. See listing of MDU status codes in section 2.4.2.
MOTOR	Motor type setting. Input range: Manual, Baldor ½ hp,Y602 ½ hp (Marathon motor), Baldor 2 hp, EMWB 450W, EMWB 1600W, AKM43H (Kohlmorgan servo motor for Pharma Feeder), B56H5Q (Lafert servo motor for Pharma feeder in Hazardous locations) Selecting <Manual> permits the viewing of <PAR.SELECT> and <PAR.VALUE> for the input from the motor data.
PAR.SELECT **Note:** These parameters are only needed if a CUSTOM ac motor is used. Using one of the motors from the selection list means, all of these parameters are automatically filled in with correct defaults	The motor characterization parameters in the mini-loop. FLCurrent[A] (Full load motor current in Amps) MagCurrent[A] (Motor's magnetizing current in Amps) RatedFreq[Hz] (Motor's rated frequency in Hz) MaxFreq[Hz] (Maximum frequency used by KCM Hz) MinFreq[Hz] (Motor's rated minimum frequency in Hz) OverCurrent[%] (programmable shutdown limit in% of Full Load Current) OCurrTime[s] (programmable shutdown limit in seconds) OverCurr2[%] (programmable shutdown limit#2 in% of Full Load Current) OCurrTime2[s] (programmable shutdown limit#2 in seconds) Inertia[pu] (total inertia of motor plus load in internal units) X1[Ohms] (Motor Impedance X1 parameter in Ohms) X2[Ohms] (Motor Impedance X2 parameter in Ohms) Xm[Ohms] (Motor Impedance Xm parameter in Ohms) R1[Ohms] (Motor Impedance R1 parameter in Ohms) R2[Ohms] (Motor Impedance R2 parameter in Ohms)
PAR.VALUE	Value for the selected parameter.
MAX. MOT POWER [watts] Max Motor Power	This entry sets the maximum output power to the motor. (See nameplate on motor for value) Input range: 25 to 1600 W Default: Depends upon installed drive

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Parameter	Definition
MAX MOT SPEED - [rpm] Maximum Motor Speed	Input of the maximum motor rpm for 100% drive command. Input range: Drive specific.Default: drive specific (See nameplate on motor for value)
MDU TEMP. [C] MDU Temperature	Displays the actual temperature in the MDU in °C. Input range: Display only.
MOTOR RPM	Current motor speed in RPM.
MOTORLOAD ACT Actual Motorload	Displays the actual motor load. Input range: Display only [%]
FLOOR	Minimum Command Input range: 0 to 100% Standard: 40%
CEILING	Maximum Drive Command Input range: 0 to 100% Standard: 100%
GEAR REDUC.	Enter the reduction value of the motor speed reducer.

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1.7.17 <ACTIFLOW sub-menu>

This menu is only displayed, if a ActiFlow is connected.

Parameter	Definition
DISPLACE.[%]	Displacement of the ActiFlow. Input range: Display only
MATERIAL	Setting of the vibration from the ActiFlow according to the material properties. Material selection: Off — ActiFlow off Easy — Easy flowing material (little vibration) Medium — Medium flowing material Hard — Hard flowing material (hard vibration) Manual — Manual setting Standard: Medium **Notes:** ActiFlow Ceiling: Easy = 60%, Medium = 80%, Hard = 95%
ACF FLOOR only displayed if manual	Minimum ActiFlow Drive Command Input range: 0 to 100%
ACF CEILING only displayed if manual	Maximum ActiFlow Drive Command Input range: 0 to 100%
STATUS	The ActiFlow status codes reveal operational condition of the controller. See listing of status codes in section 2.4.7.
FREQUENCY	Displays the actual frequency. Input range: Display only

1.7.18 <IMPACTOR sub-menu>

This menu is only displayed, if a digital output function “Impactor” is assigned.

Parameter	Definition
IMPACTOR PERIOD	Impactor Period is the time between impact cycles in seconds. Input range: Display only
MATERIAL	Setting of the impact duration and interval according to the material properties. Material selection: Off — Impactor off Easy — Easy flowing material Medium — Medium flowing material Hard — Hard flowing material Manual — Manual setting Standard: Medium **Note:** ActiFlow Ceiling: Easy = 60%, Medium = 80%, Hard = 95%
ACF FLOOR only displayed if manual	Minimum ActiFlow Drive Command Input range: 0 to 100% **Note:** If the ADC=100%, then the Impactor Period is 30 seconds. If the ADC=20%, then the Impactor Period is 300 seconds.
ACF CEILING only displayed if manual	Maximum ActiFlow Drive Command Input range: 0 to 100% **Note:** If the ADC=100%, then the Impactor Period is 30 seconds. If the ADC=20%, then the Impactor Period is 300 seconds.

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Parameter	Definition
IMPACTOR TIME	The Impactor Time sets the length of the pulse in mSec, 0 = output off. Also The Impactor Time can be set to make Multi-Pulse. Each Impact can be one or several pulses. To program Multiple-Pulses, use the least significant digit. For example, 503 mS gives three 500 mS pulses, 705 mS gives 5 pulses, 1000 gives one long pulse (for pneumatic vibrator) Multi-Pulse Details: • The multi pulse on time and off time are equal. E.g. 303 = 300 mS on time and 300 mS off time • Maximum time is 10 seconds total. • Duration = 9900 is allowed (one long pulse) • Duration = 707 is allowed but 708 is not. (707: 1.4 seconds * 7 = 9.8 seconds. 708 = 11.2 seconds
Table page 2 of 2	

1.8 <I/O SETUP menu>

These menus program the digital and analog I-O functions. The KSL shows these variables over four pages; Digital Output, Digital Input, Analog Input, Analog Output. The KSC uses 3 screens.

See KCM Electronics manual for wiring details

I/O Definitions:

- DENA = drive enable
- ALS = alarm shutdown
- Inputs with an * are activated by an edge transition. All other inputs are by level
- ^ indicates a digital output that can be mapped to DIGOUT MAP
- CPU_In1...CPU_In4 are for the programmable digital inputs on the CPU pcb, terminal block J8
- MDU_In1... MDU_In2 are for the programmable digital inputs on the MDU (Drive) pcb, terminal block J1
- CPU_Out1...CPU_Out4 are for the programmable digital outputs on the CPU pcb, terminal block J8
- MDU_Rel1... MDU_Rel3 are for the programmable relay outputs on the MDU (Drive) pcb, terminal block J5
- External_In1...External_In8 and External_Out1...External_Out8 are used for remote MODBUS I-O.

1.8.1 <DIGITAL INPUT sub-menu>

Parameter	Definition
DIG IN Digital Input	Selection of the desired digital input for programming. CPUin1 to CPUin4, MDUin1, MDUin2, Spare1, Spare2, ExtIn1 to ExtIn8. **Note:** For ExtIn function to work, Modbus I-O must be configured first and the external I-O module (e.g. WAGO) connected via K-Port 2.
FUNCTION Digital Input Function	Function of the selected digital input Selection: None, Start*, Stop*, Interlock, Run Enable, ALS Input, Ack Alarm*, Clr Alarm*, Start/Stop, Vol Mode, Loc/Ext, Rat/Dir, Ext Alarm, Total Clr*, Data Lock, Empty*, Ref Bypass, Ref Cmd*, Calib, Loader LVL, Loader ENA, Jog, ScrFill, AgitSync, RefVLopen, RefVLClose, ADDR+1, ADDR+2, ADDR+4, ADDR+8 Default: CPU_In_1 = Start, CPU_In_2 = Stop, CPU_In_3 = ALS Input. **Notes:** • Ref Cmd is only functional if refill is enabled and net weight is < Refill Max weight. Ref Bypass is only functional if the Refill is Enabled. • If refill is active and running, initiating a Refill Command input will terminate the refill. If the refill is not active, initiating the Refill Command input will cause the Refill cycle to begin as stated under the prior conditions. • If feeder is running then Interlock requires no Start command upon release of Interlock for the feeder to re-start • If feeder is running then Run Enable requires a Start command upon release of Run Enable to re-start the feeder
STATE Digital Input State	Displaying the actual status of the selected digital input. Input range: Display only (Off or 0 = not active, On or 1 = active)
POLARITY Polarity	The selected digital input changes the function from e.g. NO to NC. Input range: Normal or Inverse Default: Normal

1.8.2 <DIGITAL OUTPUT sub-menu>

It is not allowed to change Digital output function, polarity and map if the feeder is running.

Parameter	Definition
DIG OUT Digital Output	Selection of the desired digital output for programming. Selections: CPUOut1 to CPUOut4, MDURelay 1, MDURelay 2, MDURelay 3, Spare, ExtOut1 to ExtOut8. **Note:** For ExtOut function to work, Modbus I-O must be configured first and the external I-O module (e.g. WAGO) connected via K-Port 2.
FUNCTION Digital Output Function	Function of the selected digital output. Selections: None, Run, Any Alarm, Alr Relay, ALS Out, Drive Ena, Grav Mode, PSRMAP^, ASRMAP^, TotalPulse, Refill, Refill Exp, Loader, BlowOff, HiLowGear, Impactor Default: CPU_Out_1 = Feeder Run, CPU_Out_2 = Refill, CPU_Out_3 = Hard Alarm, CPU_Out_4 = Drive Enable, MDU_Relay1 = None, MDU_Relay2 = Refill, MDU_Relay3 = None
STATE Digital Output State	Displaying the actual status of the selected digital output. Input range: Display only (Off or 0 = not active, On or 1 = active)
POLARITY Polarity	The selected digital output changes the function from e.g. NO to NC. Input range: Normal or Inverse Default: Normal
EXT TOT PULS External Totalizer Pulse	Input of the resolution of an external Totalizer Input range: 0* to 999999 Default: 0 kg/pulse The maximum pulse rate is 3 pulses/second. The calculation of the increment is as follows: Ext Tot Increment(min) = Massflow[kg/hr]/1000
DIGOUT MAP Digital Output Map	If at the variable <FUNCTION> the selection PSR-MAP or ASR MAP was made, it is possible to program any output function listed in the table in the appendix. See sections 2.6 and 2.8.

1.8.3 <SETPOINT INPUT sub-menu>

Refer to manual KCM Electronics for more information.

For calibration see section 1.8.5

Parameter	Definition
SOURCE Analog Input Source	Selection of the desired setpoint input. Select: CPU_0-10kHz, CPU_Analog, Extern **Notes:** • See KCM Electronics manual for wiring details when selecting CPU source inputs. • For Extern function to work, Modbus I-O must be configured first and the external I-O module (e.g. WAGO) connected via K-Port 2. • Check the jumper on the KCM CPU for the following possible choices: 0-5 VDC, 0-10 VDC, 0-20 mA if CPU_Analog is the input selection.
AIN VALUE-[%] Analog Input Value%	Display of the actual input value in percentage of the maximum value, AinMax as defined below. Input range: Display only
AIN MIN-[%] Analog In Value Min	Scaling of the analog output for the minimum value. (Offset adjustment e.g. 20% for 4 mA). This value can be used also to invert the analog input. Input range: 0 to *100% *Inverted 100%
AIN MAX-[%] Analog In Value Max	Scaling of the analog output for the maximum value. This value can be used also to invert the analog input. Input range: 100 to *0% Default: 100% *Inverted 0%
DEADBAND-[%] Deadband	Input of the deadband in percentage of the maximum value. Changes at the input below this value will have no change to the setpoint value. Input range: 0 to 100% Default: 0%

1.8.4 <ANALOG OUTPUT sub-menu>

- The KCM CPU only outputs a 0 - 20 mA current value. Use appropriate resistors to convert to the desired voltage.
- Maximum source voltage is 12 VDC for the current output.
- For calibration see section 1.8.5

Refer to KCM Electronics manual for more information on electrical connections and operational limitations.

Parameter	Definition
AOUT NUM Analog Output	Selection of the desired analog output. Select: CPU, EXT1 - EXT3. Input range: See list **Note:** For Ext1-Ext3 functions to work, Modbus I-O must be configured first and the external I-O module (e.g. WAGO) connected via K-Port 2.
FUNCTION Analog Output Function	The analog output can be assign with the following function: SETPOINT (20mA/Max. setpoint) x Actual setpoint MASSFLOW (20mA/Max. setpoint) x Massflow NETWEIGHT (20mA/Scale range) x net weight DRIVE COMMAND (20mA/100%) x Percent drive command MOTOR SPEED (20mA/Max Mot RPM) x Act Mot Spd FEEDFACTOR (12mA/Init FeedFactor) x actual feedfactor) TORQUE (20mA/100%) x Percent torque ANALOGIN Retransmit Analog Input Input range: See list Default: None
AOUT VALUE%] Analog Output Value%	Display of the actual output value in percentage of the maximum value. Input range: Display only
AOUT MIN Analog Output Minimum	Scaling of the analog output for the minimum value. (Offset adjustment e.g. 20% for 4 mA) This value can be used also to invert the analog output. Input range: 0 to *100% (*Inverted 100%)
AOUT MAX. Analog Output Maximum	Scaling of the analog output for the maximum value. This value can be used also to invert the analog output. Input range: 100 to *0% Default: 100% (*Inverted 0%)

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Parameter	Definition
DEABAND-[%] Analog Output Deadband	Input of the deadband in percentage of the maximum value. Changes at the output below this value will have no change to the process value. Input range: 0 to 100% Default: 0%
Table page 2 of 2	

1.8.5 Calibrating analog I-O

The formula for an analog value output can be demonstrated by the following formula as an example. Setpoint will be used as the value and 20 mA is the full scale representation.

$$Val = 20 \times \left[\left(\frac{Setpoint}{MaxRate}\right) \times (AoutMax - AoutMin) + AoutMin\right]$$

Deadband works as indicated in the following equations.

$$Val \leq Deadband(Val \rightarrow 0)$$

$$\Delta Val \leq Deadband(Val \rightarrow PreviousVal)$$

$$\Delta Val > Deadband(Val \rightarrow NewVal)$$

To calibrate an analog output, do the following. In this example, setpoint is the output parameter. Have your calibration meter connected to the analog output.

1. Enter Setpoint =0.
2. Modify the min value so that the actual analog output is correct.

For a 4-20 mA signal, this will be around 20%.

3. Enter Setpoint = Max Setpoint, Adjust Aout max value so that analog output is exactly correct.
4. Double check with Setpoint = 0, but no adjustment is normally required.

1.8.6 <MODBUS I/O sub-menu>

This menu is not available on the KSL, K-Vision or KSC.

Parameter	Definition
ADDR 80 - 83	These are the read only I-O addresses for any external Modbus I-O that has been connected to K-Port 2. For each address, the module type (if connected) or problem will be indicated. Possibilities at each address are: WAGO, MISSING, CONFLICT, NONE WAGO = the Wago system of Modbus I-O modules is connected. CONFLICT = Addresses of connected modules are in conflict after powering the system. Select <REBIND NOW>**.** Press **ENT** twice to clear the fault. MISSING or CHANGED = Module that was present is no longer found. Select <REBIND NOW>**.** Press **ENT** twice to clear the fault. Input range: 80 to 83 Default: 80
DETAILS	This read only parameter presents information about the operation of each connected external Modbus I-O device. Node Select: 80, 81, 82, 83 Type Select: Anlg In, Anlg Out, Dig In, and Dig Out are the possible functionality for connected modules I/O Point: 1-8. – Up to 8 points, of the same type, are possible at any address.
REBIND NOW	When the I-O functions have been configured, press the **ENT** key twice to rebind variables to the I-O points installed. **Note:** If alarm 39 occurs (Ext_IO_Fail), the <REBIND NOW> function can clear the alarm. However, this action will remove all external I-O function. It is best to examine why the external module failed before executing Rebind Now. The <REBIND NOW> function assigns <None> to any previously programmed external I-O point and then performs a new binding based upon the rule as follows: Lowest module by address with lowest I-O point is assigned the lowest I-O number e.g. Four digital input module at address 80 is automatically bound with EXTIN1 at module input 0 to EXTIN 4 at module input 3. After the <REBIND NOW> action, each I-O point requires reassignment of its function. e.g. <Start>.

1.8.7 Adding External Modbus I-O, an example

Follow this procedure to configure remote I-O.

⇒ Preset the Modbus I-O module to an address of 80, 81, 82 or 83.

⇒ Program the Modbus I-O module to follow the K-Port 2 communication specifications

– 19,200 baud, 8E1

⇒ Program K-Port 2 for Modbus I-O

⇒ Make all wiring connection between the KCM and the external modules

Then do the following:

1. Power the KCM and the external I-O modules together.
2. Use the <MODBUS I/O sub-menu> to perform the following set-up.

If it is not possible to power the KCM and modules together, then once everything is powered, select <REBIND NOW> parameter to permit module binding.

3. Verify that at the module preset address, the specific module is found by name at the parameter <ADDR80-83>. e.g. 80 = WAGO.
4. Open the <DETAILS sub-menu>.
5. Enter module address at <NODE SELECT>.
6. Open <TYPE SELECT>.
7. Note that if the automatic binding was done properly, the module will have each I-O point already set to a KCM input or output point.

e.g. If the module was a digital 4 input module at address 80, the screen would look like this:

I/O POINT 1 -> EXTIN1

I/O POINT 2 -> EXTIN2

I/O POINT 3 -> EXTIN3

I/O POINT 4 -> EXTIN4

I/O POINT 5 -> None

I/O POINT 6 -> None

I/O POINT 7 -> None

I/O POINT 8 -> None

8. Go to the specific I-O menu and set the function for each active I/O point. e.g. set the digital input function for <Clr Tot>.
9. Test the function of each module I-O point.

1.9 <LOADER menu>

This menu programs the vacuum loader function. No HCU/LSR is required. See section 1.10 for more information on loader applications.

- In later KCM S/W versions 1.3 and later, this menu will be hidden if an HCU is connected to the KCM.
- Be sure the parameter <LOADER FUNCTION> in this menu is <Disabled> if a loader with HCU control is to be used.
- To show the <LOADER menu> set in the <SECURITY menu> <loader> to <RD/WR>.

Parameter	Definition
LOADER FUNCTION Loader Function	Selects whether loader runs or not. Select <KCM IO> or <EXTERNAL> to run, <OFF> to stop. **Note:** If the KCM is using an LSR or MPC system to refill the feeder, this parameter should be set to "External".
MAX LOAD TIME Max Load Time	Load time in seconds to reach the high level proximity sensor. An alarm will occur if the high level is not reached in this time. Default: 30 seconds
SHUTDOWN TIME Shutdown Time	Time, in seconds, for the motor to wind down at the end of the load cycle. Default: 5 seconds
DISCHARGE TIME Discharge Time	Time, in seconds, it takes to discharge the loader contents. Default: 10 seconds
VALVE CLOSE TIME Valve Close Time	Time, in seconds, it takes for the discharge valve to close at the end of a discharge. Default: 5 seconds

1.10 Programming the loader function

Use this procedure to program the KCM for the internal loader function. This is not for the LSR/HCU loader function.

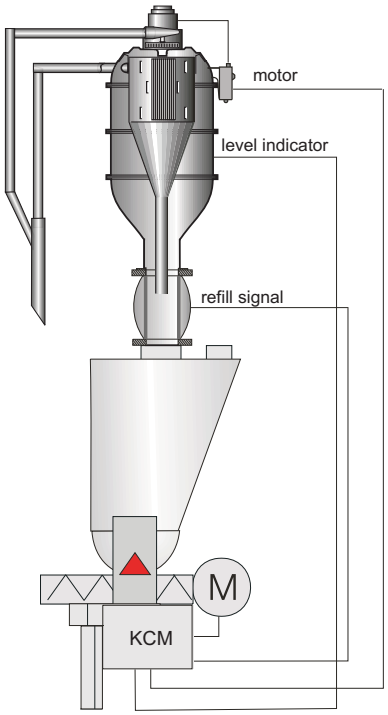


Fig. 1.1 KCM with Loader

The Level Indicator must be placed so that it is covered when the loader is full. The loader motor will stop and start based on this signal.

1. Connect the motor contactor to a relay output of the Drive Board (e.g. REL 3).
2. Connect the Refill valve to a relay output of the Drive Board (e.g. REL 2).
3. Connect the level indicator to a bit input of the Drive Board (e.g. IN 1).
4. In the <I/O SETUP menu>, program the following parameters:
   – <MDU IN1> to <Loader Level>
   – <MDU REL 3> to <Loader>
   – <MDU REL 2> to <Refill>
5. In the <SECURITY menu>, change the security mode of the <LOADER menu> to <RD/WR>. This will not be possible if a bit input is assigned to DATA LOCK and the bit input is not activated. In this case, activate the data lockout input or program the corresponding bit input in the <I/O SETUP menu> to <None>.
6. In the <LOADER menu>, program the <LOADER FUNCTION> to <On>.
7. In the <PRODUCT CHANGE menu>, program appropriate refill levels and set <REFILL> to <Enable>.

The loader will start and the feeder will refill.

- The loader will only work if refill is enabled.
- Refill and loader can be interlocked with Run/Stop input of the feeder controller. When programming <REFILL> to <If Running>, the loader will only run if the feeder also runs.
- If a bit input is programmed to <Ldr Enable>, the loader will only work if the corresponding bit input is activated.

1.11 <HCU / LSR LOADER menu>

This menu programs the Hurricane loader function. This menu is used in place of the HSU.

- This menu is only displayed, if a HCU / LSR is connected.
- The HCU / LSR Loader controller is connected to the KCM via the Internal Channel.
- Be sure that the LOADER parameter is <disabled> in the <LOADER menu>. Hide the <LOADER menu>.

- See manual 0290023601 for more HCU loader operational information.
- See manual 1090034605 for more LSR operational information.
- See KCM Electronics manual for more information.

Parameter	Definition
COMMAND **Loader Command**	The following commands can be selected and be executed with the **ENTER** key: None — No function Run — Starts the conveying cycle Stop — Stop the conveying cycle Clr Alrm — Deletes all pending alarms Disch On — Starts discharge Disch Off — Stops discharge ▲ Conveying starts if you press **ENTER** at the selection <RUN>. The process can be stopped only by selection of the command stop. The **START/STOP** key on the control unit does not have a function for the loader.
CYCLE Active Cycle	Displays the current active cycle. Motor — Motor Timer active. After the timer expired the motor will stop. LoadDly — Delay until the valve is closing and a new conveying cycle is starting. Load — Hurricane is conveying material. Line Clr — Conveying pipe emptying cycle is active. DischDly — Discharge delay time. Delay = Time until the motor stops. Disch — Discharge cycle: Display only. Input range: Display only

Table page 1 of 2

Parameter	Definition
TIME [sec] Active Time	Remaining time in the current active cycle. Input range: Display only
STATUS Loader Status	Display of the current status of the HCU. Normal OK. ALARM — HCU has an alarm. PROG — HCU in programming mode. REC FULL — Receiver is full. BUFFER FULL — Buffer hopper is full. HCU COM FAIL — Serial communication between KCM and HCU interrupted. Input range: Display only
PARAM NUM Only in KSU-II/KCM	Input of the parameter number. The name and value represented by the parameter number will be displayed under the variables PARAM DESC and PARAM VALUE respectively. Input range: see section 2.4 and manual 0290023601.
PARAM VALUE Parameter Value	Input of the desired value for the selected PARAM NUM. input range: see section 2.4 and manual 0290023601.
PARAM NAME Parameter Name	Display of the parameter name selected with PARAM NUM. Input range: Display only See section 2.4 and manual 0290023601.
Table page 2 of 2	

1.11.1 Programming parameters for HCU

This table shows parameter number and description, which can be entered in the section 1.11 for HCU loader control.

Param Number/ Param description	Param.	Min	Max	Step	Default	Actual
P1 – Load Timer **(Cycle 3)**	Load	5 sec	300 sec	1 sec	20 sec	
P2 – Clear Timer **(Cycle 4)**	LineClr	0 sec	30 sec	1 sec	0 sec	
P3 – Discharge Timer **(Cycle 6)**	Disch	2 sec	90 sec	1 sec	10 sec	
P4 – Filter Delay Timer	Fill Dly	1 sec	5 sec	0.1 sec	5 sec	
P5 – Filter Pulse Timer	Fil Pul	0 sec	0.5 sec	0.1 sec	0.1 sec	
P6 – Motor Timer **(Cycle 1**)	Motor	30 sec	1620 sec	30 sec	5 min	
P7 – Load Delay Timer (**Cycle 2)**	Ld Dly	0 sec	20 sec	1 sec	5 sec	
P8 – Discharge Delay Timer **(Cycle 5)**	Dis Dly	0 sec	20 sec	1 sec	5 sec	
P9 – Input Filter: Receiver Proximity Sensor	In: Rec	0.1 sec	10 sec	0.1 sec	3 sec	
P10 – Input Filter: Buffer Hopper Proximity Sensor	In: BuH	0.1 sec	10 sec	0.1 sec	3 sec	
P11 – Input Filter: Supply Hopper Proximity Sensor	In: SuH	0.1 sec	10 sec	0.1 sec	1 sec	
P12 – Input Filter: Remote Start	In: Strt	0.1 sec	10 sec	0.1 sec	0.5 sec	
P13 – Input Filter: Remote Stop	In: Stop	0.1 sec	10 sec	0.1 sec	0.5 sec	
P14 – Input Filter: Discharge Valve Switch	In: DisV	0.1 sec	10 sec	0.1 sec	1 sec	
P15 – Input Filter: Filter Pressure Switch	In: FiPs	0.1 sec	10 sec	0.1 sec	1 sec	
P16 – Input Filter: Discharge Request	In: DiRe	0.1 sec	10 sec	0.1 sec	1 sec	
P17 – Input XOR Mask	Xor Msk				7F(dec127)	
P18 – Oper M (Operating Mode) 1 = Self contained with discharge valve, 2 = Single central with discharge valve, 3 = Self contained, 4 = Single Central	Oper M				1	
P19 – Clean Filter 0 = disables all cleaning, 1 = clean during discharge cycle, 2 = clean during load cycle, 3 = clean during both discharge and load cycles.	Clean M				1	
P20 – Discharge Mode, 1 = Fill mode, 2 = LWF mode	Disch				1	
P21 – Controller Address	HCUAdd				0x01	
P22 – Controller Software Version	HCU SW					
P23 – Supply Hopper Low Alarm Timer	Al ShLo	0 sec	600 sec	10 sec	0 disable	
P24 – Differential Pressure High Alarm Timer	Al DPHi	0%	100%	1%	0 disable	
P25 – Load Cycle Alarm Counter	Al Cycle	0 cycle	20 cycle	1 cycle	0 disable	
P26 – Discharge Valve Alarm Timer	Al Valve	0 sec	15 sec	1 sec	10 sec	
P27 – On/Off Counter	O/F Cnt			N/A		
P28 – Run Time Counter	Run Cnt			N/A		
P28 – Handheld display Software version	HSU SW			N/A		
P63 – Digital input states	Dig In			N/A		

1.12 <SYSTEM menu> (only KSU-II/KCM).

This menu is only used with the KSU-II/KCM display and not available for KSL, K-Vision or KSC.

This menu programs the key communication functions for the KCM.

1.12.1 <COMMUNICATION sub-menu>

Siemens 3694R protocol is not supported.

Parameter	Definition
HOST PROT	Input of the desired communication protocol Input range: Modbus, ALLEN BRAD AB-CIF, Siemens 3694R, ProfibusDP, Modbus/TCP, DeviceNet, Ethernet/IP, ModbusPlus, Profinet IO. Default: None
HOST FILE	Select either a custom downloaded *.kgr file for data communications or select a pre-loaded file (built-in). See manual 0590020611 for details. Input range: Kgr File, Small, Full. Default: Kgr File
IP	IP Adress Only present when an Ethernet Host board is installed. If the KGR file is used, this parameter is read-only.
NM	Net Mask Only present when an Ethernet Host board is installed. If the KGR file is used, this parameter is read-only.
GW	Gateway Only present when an Ethernet Host board is installed. If the KGR file is used, this parameter is read-only.
K-PORT1 PROT	Selects the function for K-Port1 Input range: None, KSU, KSL, KSC/K-Vision. Default: KSU
BAUD RATE	Displays baud rate selections when K-Port1 is set to KSC/K-Vision or if set to KSL and the service variable K10S_KCDR is <1>. Input range: 9600, 19200, 38400, 57600, 115200

Table page 1 of 2

Parameter	Definition
K-PORT 2 PROT	Selects the function for K-Port2 Input range: None, KSU, Modbus I-O, KSC/K-Vision. Default: KSU
BAUD RATE	Displays baud rate selections when K-Port2 is set to KSC/K-Vision or Modbus I-O. Input range: 9600, 19200, 38400 **Notes:** • For Modbus I-O when selecting 19200 Baud, it runs at 19200, 8, E, 1 and the digital I/O have the bytes swapped (Wago750-312 mode). • For Modbus I-O when selecting 9600 Baud, it runs at 9600, 8, N, 1 and the digital I/O have the bytes not swapped (Wago 750-315/ 300-000 Default mode).
CONF MODE	Input of the protocol for the following: Diag, KMB, Config, User IF Input range:see above Default: User IF **Notes:** • Select <KMB> for ParamStore. • Select <Config> for SmartConfig activities. • Select <User IF> for PC access to KCM parameter data via the Conf port. • Select <Diag> is used for diagnostic trace functions and for loading a language file.
Table page 2 of 2	

1.12.2 <SW VERSIONS sub-menu>

Parameter	Definition
SELECT ONE	Selection of the Hardware for Informations Input range: KCM CPU, MotorDrv, ActiFlow, LSR, EPC, Host Board.
SW#	The application software part number and revision.
HW#	The hardware number and revision. The Host Board HW# will be shown as: Profibus, DeviceNet, ModbusPlus, EthIP/ModTCP, ProfinetIO, Comm Board, or blank, if no board is installed.
SER#	The serial number.
HPORT#	The firmware version host port board
BOOT#	The bootstrap version

1.12.3 Drive type by displayed MDU#

MDU # Software from Display	MDU Drive Type	PCB Part Number
04900-20211	1600 Watt DC motor drive	0000002610
02900-20200	450 Watt DC motor drive	0000007405
14900-20201	450 Watt DC motor drive	0000007405
17900-20201	AC VFD	0000046813
04900-20202	AC Interface	0000003413
03900-20202	Vibratory drive	0000000684
04900-20212	Universal stepper drive	0000005987
02900-26200	LoPo stepper drive	0000001430
02900-26200	HiPo stepper drive	0000004568

1.12.4 <PARAMETER BACKUP sub-menu>

This menu provides a method for parameter back-up in the KCM K-Prom.

It is important to save your programming to the K-Prom using the steps below, once your programming is verified and complete.

Parameter	Definition
PASSWORD Entered Password	Password to access the <ACTION> function of saving and recalling data from a K-PROM. Default: <1234> See section 1.12.5 on how to change this entry.
ACTION Backup Action	Action functions are: Save, Recall. <SAVE> stores active operational data to the back-up storage area of the K-PROM. <RECALL> places into active operational memory the saved K-PROM data.

1.12.5 Changing the K-PROM password.

See manual 0690020601 for detailed information on changing the K-PROM password with your PC.

1.12.6 <CLOCK sub-menu>

- This menu is only available for the KCM (graphic display).
- When the KCM is connected to a K-Vision, the clock parameters will be set automatically from the K-Vision to synchronize all system clocks.

Parameter	Definition
YEAR	
MONTH	
DAY	
HOUR	
MINUTES	
SECOND	

1.13 <SECURITY menu> (only KSU-II/KCM)

This menu sets access for all menus in the KSU-II/KCM.

- The access to the parameter in the <SECURITY menu> can be de-activated by the data lockout input of the KSU-II/KCM display (see section 1.13.2).
- All programmed security selections (e.g. RD/WR) will be de/activated immediately by programming the ACCESS TYPE.
- Menus marked with * are hidden by default.

1.13.1 Security parameters

Parameter	Definition	
PRODUCT CHANGE CALIBRATION ALARM TUNING REFILL SCALE MACHINE SETUP I-O SETUP LOADER HCU LOADER* SYSTEM	**AccessType**	**Permission**
	RD/WR	Reading and writing possible.
	READ	Read only possible.
	HIDE	No access menu. Menu is not visible.
FDR BEING VIEWED	Only shown on KSU-II	
TOTAL KEY	Select: <Clear Only>, <Rd Only>, <Any Num> as entries.	
SP ACCESS	Select: RD/WR, Read. Hide.	
KEYS	Select: All Enabled, Disa Vol/Grav, Disa AlarmClear, Disa Vol&AlCl	
	All Enabled =	all function buttons active.
	Disa Vol/Grav =	disable GRAV/VOL key
	Disa AlarmClear =	disable alarm CLR key
	Disa Vol&AlCl =	disable GRAV/VOL & alarm CLR keys

Table page 1 of 2

Parameter	Definition
CONFIRM RUN KEY	Setting this to YES, will make all Start button pushes from the KCM/ KD Keypad popup a confirm dialog that needs to be acknowledged by the operator for the feeder to actually start. Input range: YES / NO Default: NO
Table page 2 of 2	

1.13.2 Function data lock out

For additional information see Electronics manuals for KCM and for KSU-II.

To activate the security function is it necessary to assign a digital input to <Data Lock> by KCM or use the data lock input from KSU-II and to connect a key switch to that input. To enable the <SECURITY menu> to change the settings the key switch needs to be closed. When the settings are made and the key switch is opened, the <SECURITY menu> and all the menus set to read only, will be read only. To prevent that an operator can disable the key switch in the <I/O SETUP menu>, the <I/O SETUP menu> should be set to read only or to hidden.

Programming procedure:

1. Close key switch.
2. Select <SECURITY menu>
3. Select menu which needs to change.
4. Press **ENTER** key.
5. Select with **NEXT** key the security mode RD/WR or read or hide.
6. Press **ENTER** key.
7. Open key switch.
8. Check the menu for function.

2 Appendix

2.1 Automatic Gear Switching for LWF

- See KCM Electronics manual for wiring information on reversing motor rotation.
- Automatic gear switching is only possible on selected K-Tron feeders that utilize the dual speed gearbox. Refer to the feeder manual for specific details.

To use the gear switching one must connect a reversing contactor to a digital output of the KCM. It can be a CPU on-board output or a relay of the motor drive board. The output will be activated for low gear and deactivated for high gear.

It is recommended to use two digital outputs where one output polarity is inverted. Each output should control one contactor, one for normal, on for reverse. The motor shall be disconnected if the contactors are inactive. There should be further an interlock so that it is not possible that both contactors are activated at the same time.

This has the advantage that not correct entered parameters or a hardware fault (e.g. a power failure) will not reverse the motor while it is running.

Gear switching is automatically enabled, if in the programming, a digital output is assigned to <HiLowGear>.

When gear switching is enabled, the following parameters are visible in the menu:

<MACHINE SETUP menu>, <MOTOR sub-menu>, <GEAR RED.LO> and additionally in the <PRODUCT CHANGE menu>, <GEARSWITCH> (choices: High, Low, Auto Hi, Auto Lo).

To work properly, the correct high and low gear reduction values must be entered to the GEAR REDUC. and the LOW GEAR REDUC.L. parameters. The value <Gear Reduc> is the highest screw speed/ lowest value reduction while the <Gear Reduc L.> is the lowest screw speed/highest reduction value.

The lower gear reduction ranges from 1 to 10 times the high gear reduction. Auto-checking of the parameters is done to verify the proper relationship between the two entries.

Switching is only enabled if the feeder is stopped, the Drive has no run signal and the raw speed from the Drive is < 2 rpm for at least 3 seconds.

When the gear switches from high to low or vice versa, the initial and the average feed factor will be set to the average feed factor times the gear ratio. The screw speed modulation algorithm will automatically use the correct gear reduction.

To operate the gear switch manually, the user can select <High> or <Low> to the <GEARSWITCH> parameter in the <PRODUCT CHANGE menu>.

To operate the gear switch automatically, the user can select <Auto Hi> or <Auto Lo> to the <GEARSWITCH> parameter in the <PRODUCT CHANGE menu>.

When entering a setpoint which will generate a drive command of more than 50% and the <GEARSWITCH> is on <Auto Lo>, the gear will switch to high and the <GEARSWITCH> parameter changes to <Auto Hi>. When entering a setpoint which will generate a drive command of less than 10% and the <GEARSWITCH> is on <Auto Hi>, the gear will switch to low and the <GEARSWITCH> parameter changes to <Auto Lo>.

2.2 Refill Algorithms

Refill modes selections include:

- Manual
- Auto (Automatic)
- AutoTrm (Automatic terminate)

2.2.1 Refill Mode: Manual

Manual refill mode is designed for those applications, particularly for low federate applications where bulk material will be randomly added to the feeder.

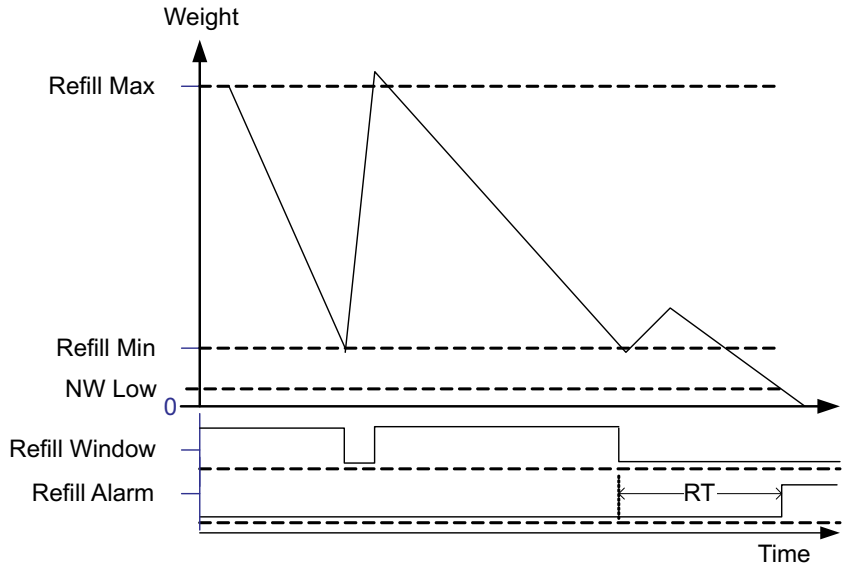


Fig. 2.1 Manual refill function diagram

Note:
RT= refill time

The KCM is always in gravimetric control mode. The KCM switches to Volumetric control when the hopper weight drops below the Net Weight Low <NW.LOW LIMIT>. If the Refill Window remains active the Refill Timer times out and activate the refill timer output. As shown above the value RT is the Refill Timer setting.

When the net weigh starts to increases, the controller switches to VOL control.

2.2.2 Refill Mode: Auto

Automatic refill mode-terminate is designed for those applications where material addition to the feeder is from an automated refill system.

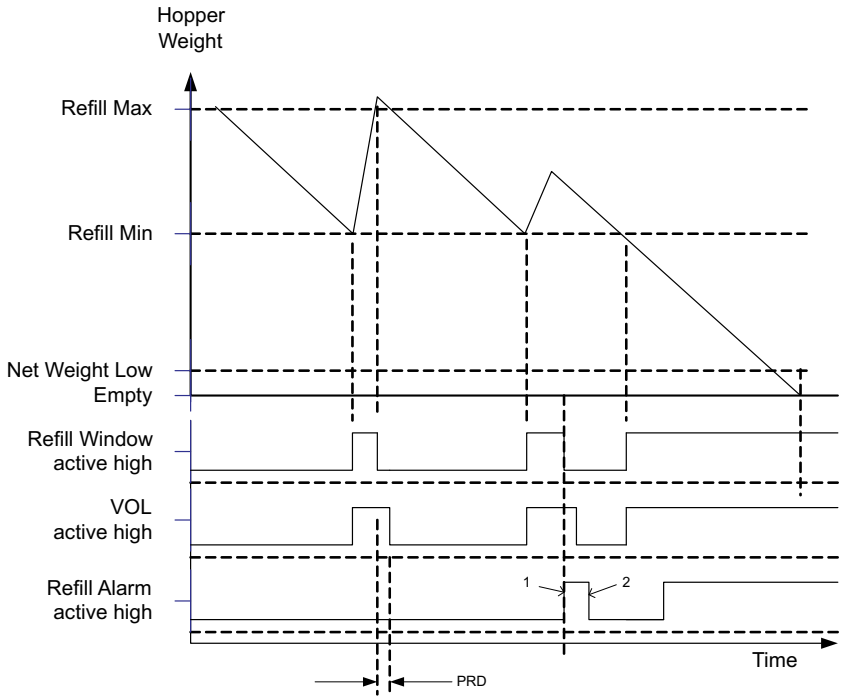


Fig. 2.2 Auto refill function diagram

At point #1, the refill timer expires and the refill timeout alarm activates. This resets the Refill Window. At point #2, the Refill Timer alarm has been cleared by the operator.

Note:

PRD = post refill delay time

2.2.3 Refill Mode: Auto Terminate

Automatic refill mode-terminate is designed for those applications where material addition to the feeder is from an automated refill system.

Note:

PRD = post refill delay time

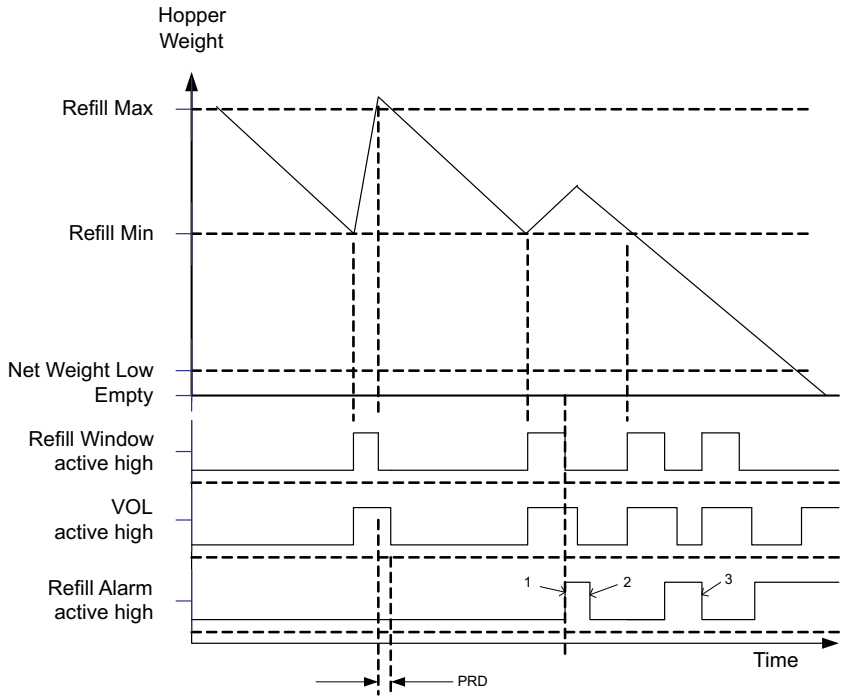


Fig. 2.3 Auto terminate refill function diagram

At point #1, the refill timer expires and the refill timeout alarm activates. This resets the Refill Window. At point #2, the Refill Timer alarm has been cleared by the operator. Clearing the Refill Alarm reactivates the refill window when the weight is below Refill Minimum as shown at point #3.

2.2.4 Refill using the integrated loader function

If the <Loader> function parameter is set to <On> and <Refill> is <Enabled> and the loader enable bit input is activated, the internal KCM loader algorithm is enabled.

Normal operation sequence:

- When the refill completes, it waits for a programmable <Valve Close Timer>.
- If the proximity high level switch input is deactivated, the loader motor starts.
- When the loader is full, the high level proximity input is activated. This must happen before the programmable <Maximum Load Time>, otherwise it will generate an alarm.
- The high level proximity input must be activated for 2 seconds until it stops the motor.

- Alarm conditions:
  - High level proximity input does not get activated after the maximum load time.
  - High level proximity input is not activated before a refill

A normal refill and load cycle is shown next.

Note:

- VCT = valve close time
- Prox Switch input High = no material at probe

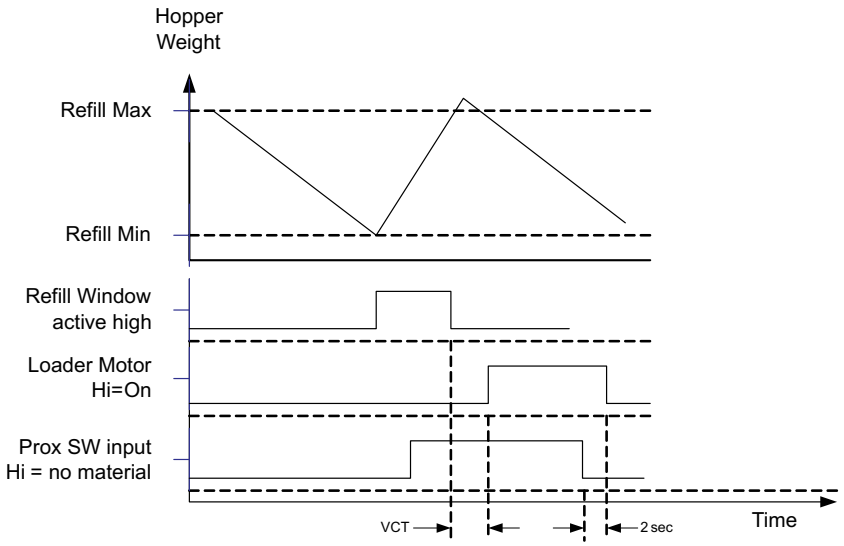


Fig. 2.4 Normal refill and load cycle function diagram

The next diagram shows the refill & load cycle when loading of the loader hopper fails.

Note:

- Loading restarts after refill or after alarm clear.
- VCT = valve close time
- MLT = maximum load time
- Prox Switch input High = no material at probe

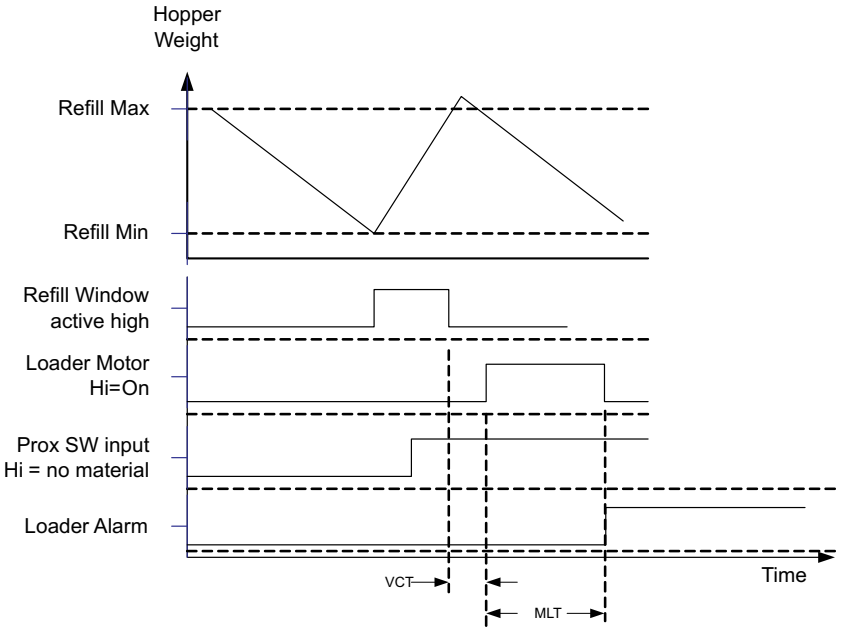


Fig. 2.5 Normal refill but failed loading function diagram

The next diagram shows refill with empty loader due to failed proximity switch

Note:

- DT = discharge time
- Prox Switch input Low = material at probe

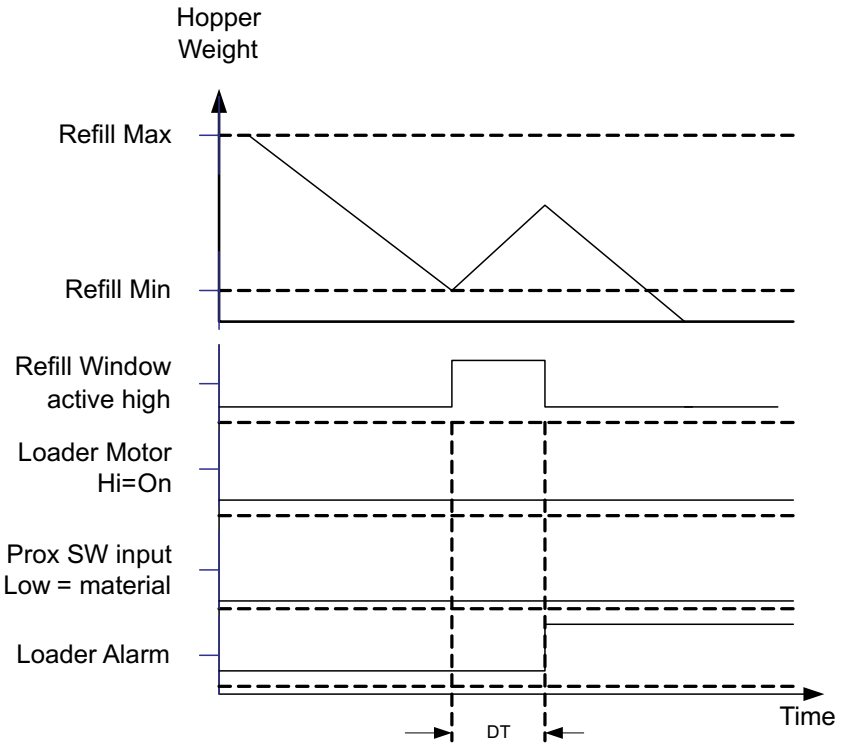


Fig. 2.6 Refill with empty loader due to a failed high level prox. switch

The next diagram shows refill during loading of the loader hopper.

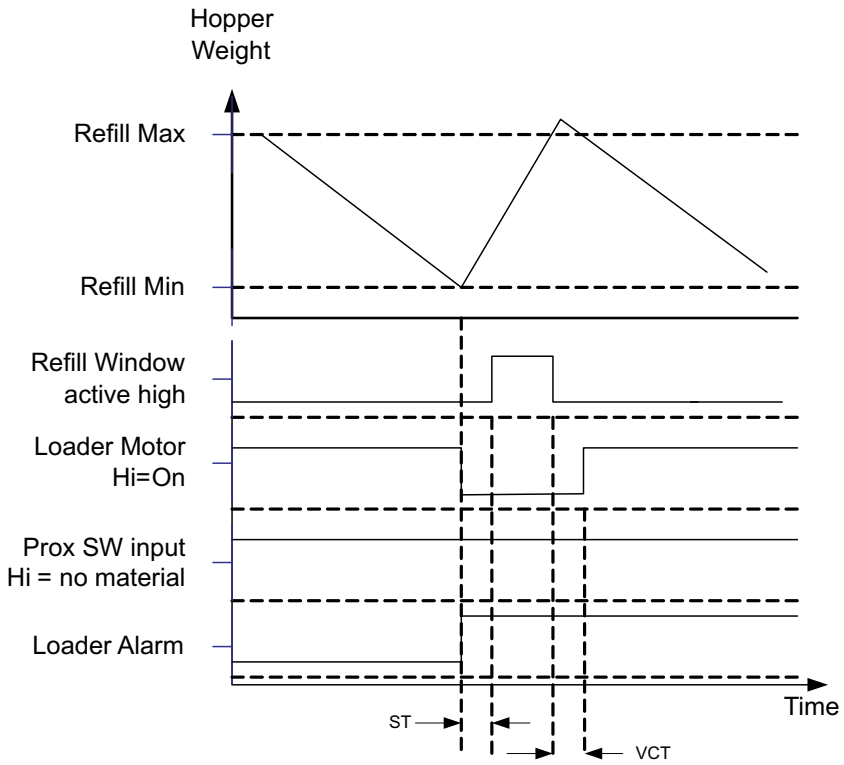


Fig. 2.7 Refilling while loading the hopper loader function diagram

Note:

- VCT = valve close time
- ST = shutdown time for the loader motor

The next diagram shows loading an empty hopper.

Note:

- SH = loader motor shutdown time
- DT = discharge time
- VCT = valve close time
- #1 refers to when the loader is full and the high level proximity switch is On.

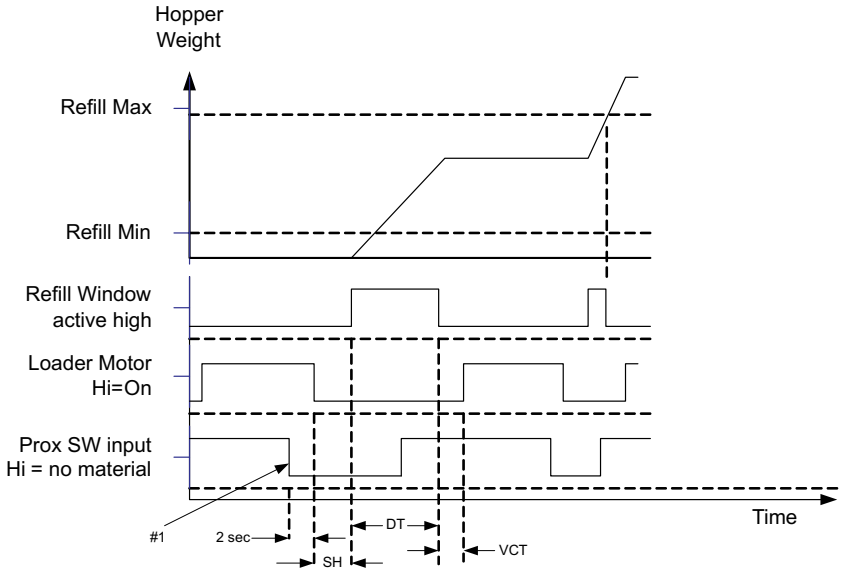


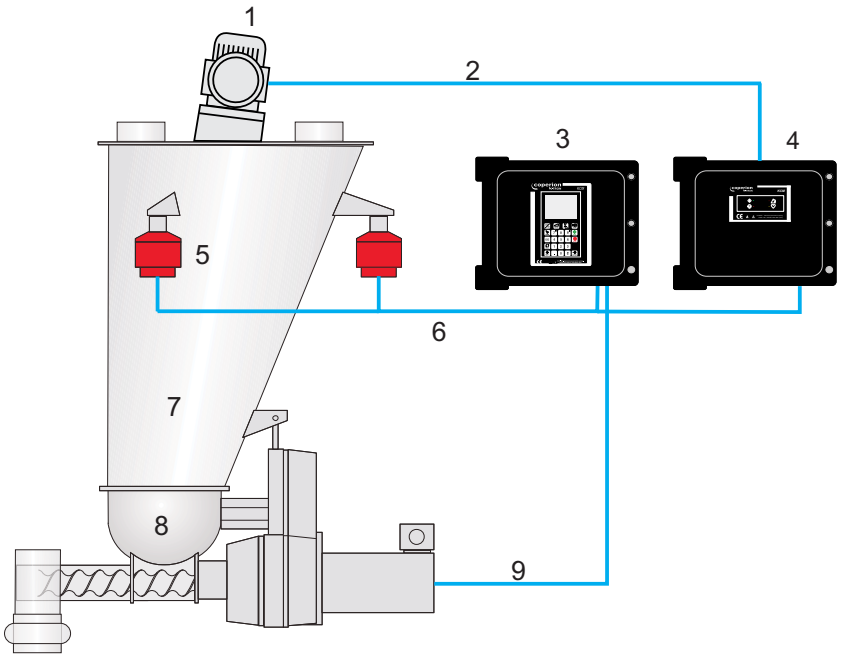
Fig. 2.8 Loading an empty loader and refilling function diagram

When the refill does not complete by the weight level, there is a programmable <Discharge Timer> parameter. If the valve is open for this time, it will close so the loader can start. After the loader is full and the motor stops, it waits for a programmable <Motor Shutdown Time>. After this time, it will reopen the valve. This cycle continues until the refill is completed.

2.3 Remote VFD Agitator Drive

This remote KCM VFD is an AC motor drive specifically used to drive the motor of a vertical agitator. The KCM VFD will connect serially to the KCM CPU using the SFT Internal Channel.

(1) Vertical agitator
(2) Motor power
(3) KCM
(4) Remote KCM VFD
(5) Weighing system
(6) Serial weight channel
(7) Extension hopper
(8) Feeder
(9) Motor power / Speed pick-up



Remote VFD Agitator Drive

2.4 Status tables

2.4.1 DC Drive hex status codes-1600/450 W drives

This table shows the possible values of the variable <MDU STATUS> displayed in <MOTOR sub-menu> 1.7.6

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Motor Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	1 = Drive enable input closed. 0 = open.	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	1 = Relay 2 energized. 0 = off.	0020
6	1 = Relay 3 energized. 0 = off.	0040
7	1 = Serial Master Time-out.	0080
8	1 = Thermal pre-alarm (>70C).	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	1 = Speed deviation	0400
11	1 = Current limit	0800
12	1 = Safety relay failure	1000
13	1 = General motor failure.	2000
14	1= Control-less running	4000
15	1 = EEPROM failure.	8000

2.4.2 AC VFD hex status codes

This table shows the possible values of the variable <MDU STATUS> displayed in <MOTOR sub-menu> 1.7.7

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Motor Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	1 = Drive enable input closed. 0 = open.	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	1 = Relay 2 energized. 0 = off.	0020
6	1 = Relay 3 energized. 0 = off.	0040
7	1 = Serial Master Time-out.	0080
8	1 = Thermal pre-alarm (>75C).	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	1 = Speed Deviation alarm	0400
11	1 = Over Current condition detected	0800
12	1 = feeder stopped due to safety switch going unconnected	1000
13	1 = general alarm that causes the feeder to shutdown	2000
14	1 = motor control state machine error	4000
15	1 = EEPROM failure.	8000
16	1 = general alarm bit caused shutdown	0001 0000
17	1 = motor alarm. No motor current detected when trying to run	0002 0000
18	1 = encoder alarm. Motor current detected, but not pulses	0004 0000

Table page 1 of 2

Bit	Function	Hex Code
19	1 = AC Mains voltage out of range	0008 0000
20	1 = I/O fault detected on 5, 12, or 24 VDC supply	0010 0000
21	1 = current above programmable user current limits	0020 0000
22	1 = motor's internal thermal switch or PTC tripped	0040 0000
23	1 = motor parameter error	0080 0000
Table page 2 of 2		

2.4.3 AC Interface hex status codes

This table shows the possible values of the variable <MDU STATUS> displayed in <MOTOR sub-menu> 1.7.8

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Motor Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	1 = Drive enable input closed. 0 = open.	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	1 = Relay 2 energized. 0 = off.	0020
6	1 = Relay 3 energized. 0 = off.	0040
7	1 = Serial Master Time-out.	0080
8	1 = Thermal pre-alarm (>75C).	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	Not used.	0400
11	Not used.	0800
12	Not used.	1000
13	Not used.	2000
14	Not used.	4000
15	1 = EEPROM failure.	8000

2.4.4 Vibratory drive hex status codes

This table shows the possible values of the variable <MDU STATUS> displayed in <MOTOR sub-menu> 1.7.10

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Motor Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	1 = Drive enable input closed. 0 = open.	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	1 = Relay 2 energized. 0 = off.	0020
6	1 = Relay 3 energized. 0 = off.	0040
7	1 = Serial Master Time-out.	0080
8	1 = Thermal pre-alarm (>75C).	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	1 = Displacement deviation	0400
11	1 = Current limit/feedback failed	0800
12	1 = Frequency limit	1000
13	1 = General drive failure.	2000
14	1 = Polarity error	4000
15	1 = EEPROM failure.	8000

2.4.5 Stepper drive hex status codes for all types

This table shows the possible values of the variable <MDU STATUS> displayed in <MOTOR sub-menu> 1.7.11 and 1.7.12

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Motor Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	1 = Drive enable input closed. 0 = open.	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	1 = Relay 2 energized. 0 = off.	0020
6	1 = Relay 3 energized. 0 = off.	0040
7	1 = Serial Master Time-out.	0080
8	1 = Thermal pre-alarm (>70C).	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	Not used.	0400
11	1 = Motor rotation failure.	0800
12	1 = Safety relay failure.	1000
13	1 = General motor failure.	2000
14	Not used.	4000
15	1 = EEPROM failure.	8000

2.4.6 SFT status table

This table shows the table of the possible Status displayed in the <SCALE menu> at the variable SFT Status 1.6.2.

Bit	Function	Hex Code
0	1 = Group mode	0001
1	1 = Group leader	0002
2	Not used	0004
3	1 = Continuous mode	0008
4	1 = Error received	0010
5	1 = Baud Rate range error	0020
6	1 = Not used	0040
7	1 = Filter on	0080
8	1 = Weight conversion complete	0100
9	1 = EEPROM read or write error	0200
10	1 = K-FFP (Fast Frequency Processor) error	0400
11	1 = Ft - temperature frequency out of range	0800
12	1 = Fw - weight frequency out of range	1000
13	1 = Weight window range error	2000
14	1 = Temperature window range error	4000
15	1 = General alarm	8000

Example:

0183= group mode, group leader, filter on, weight conversion complete.

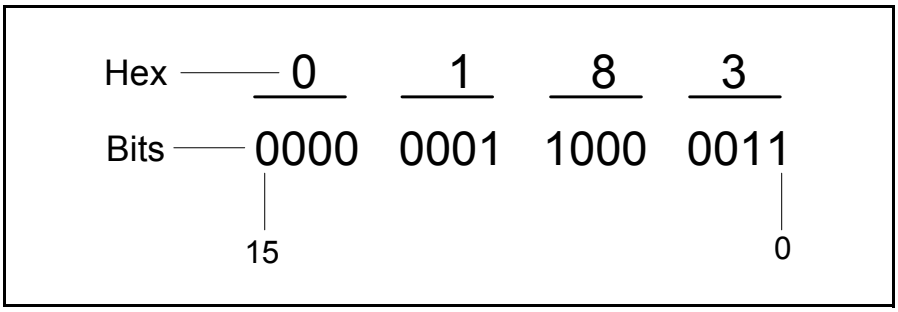


Fig. 2.9 SFT hex codes

2.4.7 ActiFlow drive hex status codes

This table shows the possible values of the variable <STATUS> displayed in <ACTIFLOW sub-menu> 1.7.17

Failure modes occur on bits 7 to 15, excluding 9

Bit	Function	Hex Code
0	1 = Activator Run. 0 = Stop.	0001
1	1 = safety switch closed. 0 = open.	0002
2	unused	0004
3	1 = Bit 1 Input activated (low level). 0 = not activated, (high level).	0008
4	1 = Bit 2 Input activated (low level). 0 = not activated, (high level).	0010
5	unused	0020
6	unused	0040
7	1 = Serial Master Time-out.	0080
8	unused	0100
9	1 = Relay 1 energized. 0 = off.	0200
10	1 = Displacement deviation	0400
11	1 = Current limit/short-circuit	0800
12	1 = Spring failure	1000
13	1 = General drive failure.	2000
14	unused	4000
15	1 = Sensor failure.	8000

2.5 Service variables

This table shows the Service Index which can be entered for the variable <S.VAR> displayed in <SERVICE SETUP sub-menu> 1.7.14.

Description	Variable	Feeder Type	Current Value
PreLoad MF=SP	When set to <1> the MF value is preloaded with SP upon KCM starts or large SP changes. When set to <2> the MF will equal Setpoint even in Volumetric mode. When set to <3> there is a quick starting massflow filter mode. The MF filter is preloaded to SP (in Grav or Vol mode) but the display filter time is reduced by a factor of 10. Then, within 2 times the display filter time, it is increased to the set value. For example, if it is set to 30 sec, it starts with 3 sec and then within 30 secs it is increased to 30 sec. Some additional optimizations had to be made to smooth out the constantly changing filter time.	all (not GWB)	
Web UI Function	WebUIFunction = 1: Disables automatic insertion of Web KSU registers in KGR and built-in files. Requires a reset of the KCM to take effect. This would be set to one if a customer absolutely needs data defined in the registers that are normally reserved for web KSU registers. When set to one the web interface virtual KSU will not show data. WebUIFunction = 2: For Ethernet boards, on next KCM power up only, disables the FTP password. This can be used if the FTP password is forgotten for recovery. The Service Variable is set back to 0 after the KCM is reset.	all	
Empty/Jog DC	Value of drive command when emptying the feeder. Default is 70%.	all (not GWB)	
Auto Span Limit	Limit in actual range of the allowed span deviation from 1.000 to allow a auto-span calculation to proceed. Default is 0.98-1.02 or an entry of 2.	all (not GWB)	
Com1 Read	K-Port 1 reads per second; <=100	all	
Com1 Write	K-Port 1 writes per second:<=10	all	
Com1 Err	K-Port 1 error counter:<= 1/hour	all	
Com2 Read	K-Port 2 reads per second:<=100	all	
Com2 Write	K-Port 2 writes per second:<=10	all	
Com2 Err	K-Port 2 error counter:<= 1/hour	all	
Host Read	Host channel reads per second: <=100	all	
Host Write	Host channel writes per second: <=10	all	
Host Err	Host channel error counter: <= 1/hour	all	
IntCh Msgs	Internal channel (SFT/MDU/LDR/ActiFlow) messages per second	all	
IntCh Err	Internal channel (SFT/MDU/LDR/ActiFlow) error counter	all	
IntCh Load	Internal channel (SFT/MDU/LDR/ActiFlow) loading in percent: <= 50%	all	
IntCh Node	Internal channel (SFT/MDU/LDR/ActiFlow) last failed node	all	
IntCh Opcode	Internal channel (SFT/MDU/LDR/ActiFlow) last opcode	all	
KpromWriteCount	Counter for the write cycles to the Kprom	all	
RefArr Dev Lim	Sets the maximum FF deviation allowed in the refill array. If the FF deviation from Refill Complete to Refill Request is greater than the RefArrDevLim, the limit is used, else the actual FF values are used. Default is 30% deviation.	LWF, LWB	
Modulation%	Shows the percent screw modulation used when <Modulation> selected. When 0%, the modulation effect is zero.	LWF	
Table page 1 of 2			

Description	Variable	Feeder Type	Current Value
AltHostMode	When set to <1> configures K-Port1 to function with a K-Commander-KCDR, a separate K-Link unit (black box) or KDU using extended software. When this entry is set to <0> K-Port1 returns to its normal function. If <KPORT1 PROT> is set to <KSL> and this entry is set to <1> then K-Port1 baud rate is selectable. When set to <2> then alarms will self clear even the alarm timed out.	all (not GWB)	
SWUpdateMode	When set to <0>, it means the comm board and all slave devices are allowed to use IAP. When set to <1>, the KCM reload the comm board software on next power up, even if the s/w versions seem the same. When set to <1> and an SFT REPOLL is executed, then the software of all devices connected on the internal serial channel are reloaded regardless of if they have the same version as stored in the KCM. When set to <2>, it inhibits all IAP function. <3> = Do not switch the internal channel to 38400 Baud. The internal channel stays at 19200 Baud.	all	
PertValueMode	0 = PertValue is displayed in Grams 1 (default) = PertValue is displayed as a% of setpoint. With setpoint=0, pert value is shown in Grams.	LWF	
MFDispFilter2	If <0>, the massflow display is filtered only by the variable <MF Display Filter>. If <1>, the display is filtered by 1 times more. If <2>, the display is filtered by two times more. etc. Maximum value = 100.	LWF	
VolRate	If set to other than <0>, this will add a variable <BULK DENSITY> to the <PRODUCT CHANGE menu>. After a Auto FF calibration is done, this value will display the volumetric capacity of the feeder.	LWF	
ForceVibAlgo	This allows to interface the AC board to 3rd party vibratory drive. If set to <1> that is used to unhide the menu parameters for the tuning and calib.	LWF	
ScaleRange	Input from the scale range.	LWF	
RefillRepTm	This parameter is zero by default. When 0, the refilling functions are all the same as before. To enable this feature, (auto restart) this new parameter must be set to a non-zero value, such as 60 (seconds) and the refill must be programmed to Auto Terminate. Then, when there is a refill time out and the Net Weight is still below the refill request point, the refill terminates (as normal), but also will start the AutoTerm Refill Repeat Timer. When this AutoTerm Refill Repeat Timer expires, the refill cycle starts over again automatically. This continues until the weight goes at least above the refill request point.	LWF	
SegIndex	Number of 0-63 that follows the belt increment	WBF, WBB	
SelfTune	0 = Off, 1 = On	PID	
Table page 2 of 2			

2.6 Global Process Status Register table

Bit code	Short Name	Description
0	dbi	Database invalid flag (For internal KCM use only). Used by K-Vision, not for customer use.
1	cvar	Changed variable present (For internal KCM use only). Used by K-Vision, not for customer use.
2	run	Motor/machine running
3	disa	Run disabled by Interlock input or run enable input
4	ena	Drive output enabled
5	als	Alarm shutdown input active
6	als_out	Alarm shutdown output active
7	al_rel	Alarm relay active
8	hard_al	Complement of Alarm relay
9	soft_al	On for any alarm present
10	warning	Warning active
13	emptying	Machine is being emptied by Empty function
15	wait	Feeder received a start command but is waiting
20	start_ok	Start input will start feeder
21	started	Started status
22	kl_init_comp	KLink initialization complete
23	ksu_present	If KSU II is present, bit is set true
24	extern	If set to true, External Setpoint mode is active, else Local SP mode
25	direct	If true and bit 24 is true, then output is in Direct Mode. If bit 24 is true and bit 25 is false, then the SP mode is Ratio
26	jog	Jog Input
27	grun	Gated Run for Run Signal on digital outputs.
28	line	Line mode
32	HCU_alarm	HCU / LSR loader alarm
Table page 1 of 3		

Bit code	Short Name	Description
33	HCU_rec_full	HCU / LSR receiver is full
34	HCU_buf_full	HCU / LSR buffer full
35	HCU_commfail	HCU / LSR communication failure to CPU
36	HCU_loading	HCU / LSR loading status
37	LSR_Running	LSR running
40	hard_interlock	Drive (MDU) hard interlock input status
41	interlock_in	Interlock input bit status
42	enable_In	Run enable input bit status
46	vol_mode_in	Volumetric input bit status
47	extern_in	Machine set for External SP bit input
48	direct_in	Machine set for Direct SP bit input
49	ext_al_in	External alarm input bit active
57	SFTCoolOut	SFT cooling output status
64	dsp_present	Local user interface present
65	init_cpl	CPU initialization complete
66	mass	Mass mode status
67	calib	Currently running an auto calibrate routine
91	impactor output	Impactor function output bit state
208	FDR_EMPTY	Feeder Empty
209	CALIB_OK	Calib OK
210	CALIB_FAIL	Calib Fail
224		Current state of KCM Digital Input #1
225		Current state of KCM Digital Input #2
...		...
239		Current state of KCM Digital Input #16
240		Current state of KCM Digital Output #1
241		Current state of KCM Digital Output #2
Table page 2 of 3		

Bit code	Short Name	Description
...		...
255		Current state of KCM Digital Output #16
Table page 3 of 3		

2.7 LWF Process Status Register table

Bit code	Short Name	Description
45	refill_bp_in	Refill bypass bit input is set
51	gear_sw_out	Hi (Lo) gear switch output bit state
52	blowoff_out	Filter blowoff function output bit state
55	acf_cal	ActiFlow Calibration cycle
56	agit_sync	Vertical Agitator sync input
68	pert	Unit in PERT condition
69	refill	Feeder is refilling by automatic means
70	ref_time	Refill timer has expired
72	fill	Screw fill status
75	ldr_full	Loader full input to control
76	loading	loading motor output
77	loadena	loader disable input
80	hi/lo gear hi	HiLowGear is in high Mode
81	hi/lo gear lo	HiLowGear is in low Mode
100	PS_SPECIAL_AGITATOR_ON_SIGNAL	This status bit is turned on for the time: (PostRefillTime - 1/ cutoff) after start, plus during and after refill.

2.8 Global Alarm Status Register table

Alarm- number	Short Name	Description
0	cb_fail	KCM Hardware error. EEPROM data is corrupt. For example, this message will occur after updating or changing firmware on the KCM.
1	kprom_fail	The K-PROM cannot be accessed by the KCM CPU. Checksum error in parameter memory
2	kprom_kgr_fail	Checksum error in kgr file area
3	power_glitch	Power fail signal but no reset
4	kprom_wrcount	K-Prom exceeded 100'000 write cycles
5	ic_fail	Internal channel has failed to communicate between the CPU and the connected devices.
6	weight_fail	SFT(s) failed Serial communication to the load cell interrupted f = SFT internal failure. communication OK t = No communication from the SFT to the controller board ?= Not valid answer from SFT
7	num_sft	Number of SFTs does not match that required.
8	BadSFTStatus	SFT is showing an incorrect status
9	NoMDUFound	The KCM CPU did not find a motor drive on the internal channel on power-up.
10	MDU NO MOTOR	No current detected after voltage sent to motor.
11	MDU_TIMEOUT	Motor drive has lost communication with the KCM CPU and then turns off all digital outputs and shuts of drive power.
12	MDU_THERMAL	Drive temperature has been exceeded > 75 deg C. Drive stops.
13	MDU_SPEED	No speed feedback signal is present when motor is asked to run. Speed deviation from target > ± 5 rpm Wrong motor voltage programmed.
14	MDU_CURRENT	Motor current limit is exceeded
15	MDU_HWFAIL	Safety Relay, Control-less run, EEprom-fail, Temperature>85°C
Table page 1 of 4		

Alarm- number	Short Name	Description
16	MDU NO ENCODER	Motor Current detected, but no speed feedback
17	MDU I/O Fault	A resettable fuse on the drive board protecting 5V, 12V, and 24 V supplies has tripped. Possibly a short circuit in wiring.
18	MDU VOLTAGE	Voltage is < 200V or > 265V
19	MDU_DRIVE_FAIL	MDU drive pcb has failed (vibratory drive only. Drive coil current too high).
20	MDU_POLARITY	Coil polarity is incorrect on the vibratory drive. (Vibratory feeder only). Displacement frequency out of range.
21	Hcu_Removed	HCU/LSR was removed.
22	HCU_alarm	HCU/LSR has an alarm.
23	HCU_eeprom	HCU/LSR EEPROM failed
24	HCU_driver	HCU/LSR digital output driver has detected a fault.
25	HCU_supp_hp	Material is below the level of the supply hopper proximity sensor. Proximity Sensor failed.
26	LDR PROX.S.FAIL	For HCU: The differential pressure across the filter is too high indicating a clogged filter
26	LDR PROX.S.FAIL	For LSR: Receiver is still full after discharge. Receiver proximity switch too sensitive adjusted or failed.
27	HCU_cyc_count	If HCU P20 Discharge Mode =01“Fill” mode then: „Gravity Gate mode“ • Max. numbers of load cycle exceeded, because Buffer Hopper Low input has been active (on) for more than the allowed load cycles. The Buffer Hopper Low signal going inactive clears the load cycle counter. If P20 Discharge Mode =02 (LWF) mode then: „Power mode“ • Discharge Request input has been on for more than the allowed load cycles. The Discharge Request signal going inactive clears the load cycle counter.
28	HCU_disch_vlv	Discharge valve has failed to either open or close properly. This alarm is automatically disabled in P18 Operating Modes 03 and 04
Table page 2 of 4		

Alarm- number	Short Name	Description
29	HCU_rec_full	Receiver is still full after discharge. Receiver proximity switch too sensitive adjusted or failed
30	Klink_Wrong_Kgr	Protocol of KGR file does not match that required by the installed communication circuit card
31	Klink_No_Kgr	No KGR file loaded
32	HPort_failil	Host communication pcb error
33	HPort_fail_init	Host communication pcb could not be initialized
34	HPort_illeg_bd	Improper pcb installed in the host port location
35	KPort_fail	K-Port has failed
36	KPort_fail_init	K-Port communication pcb could not be initialized.
37	KPort_illeg_bd	Host communication pcb is installed on the wrong port location-(K-Port).
38	KGR_param_error	One or more feeder parameters are not correct for the specified feeder
39	Ext_IO_Fail	The MODBUS I-O connection has failed
40	ext_alr	Digital input on KCM selected for External Alarm is active.
41	aux_interlock	Drive pcb Safety switch digital input is open during operation.
42	start_ignored	Start conditions not fulfilled
43	mf_high	The current massflow is above the tolerance entered in <ALARM menu> parameter <MF ERR+>
44	mf_low	The current massflow is below the tolerance entered in <ALARM menu> parameter <MF ERR->
45	dc_ceil	Drive command has reached the limit <DC CEILING>
46	dc_high	The drive command has exceed the value <DRV CMD HI> Limit in the <ALARM menu>
47	dc_low	The drive command has dropped below the value <DRV CMD LO> Limit in the <ALARM menu>
48	check_brushes	DC motor brushes may be wearing out and ready to fail.
49	reset_while_run	It is set if the feeder was running before the power down or reset occurred
Table page 3 of 4		

Alarm- number	Short Name	Description
50	acf_fail	ActiFlow Alarm.
51	acf_sensor	ActiFlow sensor failed.
62	battery_low	Lithium battery below 2.5V
65	HostTimeout	KSC/KVS host timeout
66	MDU_Controlless	Separate MDU control less running alarm
71	unexpected_reset	Unexpected reset (reset without power failure)
72	reset_digout_sw	Unexpected reset after digital output switching
73	MDU_ACILIM	AC Motor current above programmable limits. Default values for programmable limits are 150% for 60 sec, and also 200% for 5 seconds.
74	MDU_THERMOSTAT	AC drive motor thermostat open
75	MDU_PARAMERR	AC drive parameter settings incorrect
76	Agitator MDU alarm	For remote vertical agitator drive
77	Keypad Failure	The software recognizes 10 start button pushes in 10 seconds or less. If the Start button appears to be pressed down for more than 5 seconds.
100	TooManyWrites	WARNING K-Prom more than 100 K-Prom writes happen in one hour or less.
101	DC_GTS_eq_0	Warning if DC MDU and encoder = 0
102		Warning Agitator is disabled but machine runs
Table page 4 of 4		

2.9 LWF Alarm Status Register table

Alarm- number	Short Name	Description
52	ff_alarm	Feedfactor is zero or feeding condition changed so that the feedfactor exceed the set limit in the <ALARM menu> <FF DEV LIMIT>.
53	scale_over	The weight on the scale is above the scale gross range permitted.
54	scale_under	The gross weight is in the negative range < 0.
55	weight_high	The weight in the hopper is above the limit set in the <ALARM menu> <ALARM LIMITS sub-menu> <NW HI LIMIT>.
56	weight_low	The weight in the hopper is below the limit set in the <ALARM menu> <ALARM LIMITS sub-menu> <NW LO LIMIT>.
57	refill_time	The programmed refilling time in <ALARM menu> <ALARM LIMITS sub-menu> <MAX REFILL TIME> was exceeded without refilling being completed.
58	loader_empty	Loader hopper is empty
61	low_gain	Adaptive gain is 10 or below.
63	refvalve	Refill valve feedback failure
64	valve cycl exceed	Refill valve <VALVE CYC.LEFT> (Refill-Cycle-Count) parameter <ALARM menu> <ALARM LIMITS sub-menu> has reached zero. Every time the refill valve cycles, the parameter “Valve Cycles left” is decremented.
67	press_hop_range	EPC Hopper Sensor range error
68	press_dis_range	EPC Discharge Sensor range error
69	press_hop_max	EPC Hopper max pressure
70	EPC_timeout	EPC timeout

2.10 Parameter listing

Variable / Menu	Value	Value
Home		
SP		
MF		
DRIVE CMD-%		
NET WEIGHT		
MOTOR RPM		
SCREW RPM DISPLACEMENT(VIB) Not Always Visible		
AVE FF		
TOTAL		
Product Change Menu		
REFILL		
REFILL MAX		
REFILL MIN		
GEARSWITCH		
TARE WEIGHT		
INIT FEEDFACTOR		
BULK DENSITY Not always visible		
Calibration Menu		
INIT FF		
AVG FF		
CAL PRODUCT FED		
CAL CORRELA		
CAL CORR LIMIT		
CAL DC-%		
CAL TIME [SEC]		
Feedfactor sub-menu		
Table page 1 of 9		

Variable / Menu	Value	Value
FF@8%, FF@12%, FF@17%, FF@23%, FF@33%, FF@50%, FF@70%, FF@100% For vibratory only		
Alarm Menu		
Alarmlimits sub-menu		
MASSFLOW ERR+ [%]		
MASSFLOW ERR- [%]		
DRIVE CMD HI [%]		
DRIVE CMD LO [%]		
FF DEV LIMIT [%]		
MAX REFILL TIME		
NW.LOW LIMIT		
NW.HI LIMIT		
VALVE CYC.LEFT		
Alarm Setup sub-menu		
ALARM DELAY [SEC.]		
STARTUP DELAY [SEC.]		
STOPS CLRS ALARMS		
ALR NUMBER		
ALR MODE		
Tuning Menu		
PERT VALUE		
METHOD		
DISPLAY FILTER		
CTRL GAIN		
ADAPTIVE TUNE		
ADAPTIVE GAIN		
SAMPLE TIME		
SFT CUTOFF FRQ		
Table page 2 of 9		

Variable / Menu	Value	Value
MODULATION		
SP CHANGE LIMIT (Vibratory Only)		
V-AGIT.PERIOD		
Refill Menu		
REFILL		
REFILL MAX		
REFILL MIN		
POST REFILL DELAY		
REFILL MODE		
VALVE DELAY		
FLT CLEAR TIME		
MIN OPEN TIME		
REFILL ARRAY		
FEEDFACTOR 1		
FEEDFACTOR 5		
FEEDFACTOR 9		
Scale Menu		
General sub-menu		
TARE		
SPAN		
NET WEIGHT		
GROSS WEIGHT		
SCALE RANGE		
SFT sub-menu		
SFT REQUIRED		
SFTS		
SFT SELECTED		
SFT ADDRESSED		
SFT WEIGHT		
Table page 3 of 9		

Variable / Menu	Value	Value
SFT TYPE		
SFT STATUS		
SFT #		
SFT SN#		
SFT TEMP		
Pressure Comp sub-menu		
PRESS HOPPER		
HOPPER AREA		
HOPPER SPAN		
HOPP.MAX ALRM		
DISCH AREA		
DISCH SPAN		
SENSOR RANGE		
AUTOSPAN TIME		
Machine Setup Menu		
General sub-menu		
SETPOINT MODE		
MAX SETPOINT		
SP RAMP INC		
UNITS		
RUN TIME - HOURS		
FDR ADDRESS		
APPLICATION		
LANGUAGE		
SCREEN SAVER		
FEEDER NAME (Only KSL)		
Motor sub-menu		
GEAR REDUCTION		
GEAR REDUCTION L		
Table page 4 of 9		

Variable / Menu	Value	Value
PICK-UP TEETH		
ACTUAL POWER		
MAXIMUM MOTOR POWER		
MAX POWER LOW		
MAX MOT VOLTAGE		
MAX MOT SPEED		
MDU STATUS		
DC CEILING		
KV DEVICE (Vibratory Only)		
VIB SPAN (Vibratory Only)		
Service Setup sub-menu		
TRACETICK		
STOP ON PSW/ASW		
Performance sub-menu		
CONTROL		
GRAV RATIO		
INT CHANNEL		
KCM TEMPERATURE		
TORQUE		
BRUSH REMAIN		
ActiFlow sub-menu		
DISPLACE		
MATERIAL		
ACF FLOOR		
ACF CEILING		
STATUS		
FREQUENCY		
Impactor sub-menu		
IMPACTOR PERIOD		
Table page 5 of 9		

Variable / Menu	Value	Value
MATERIAL		
ACF FLOOR		
ACF CEILING		
IMPACTOR TIME		
I/O Setup Menu		
Digital Input sub-menu		
CPU1		
CPU2		
CPU3		
CPU4		
MDU1		
MDU2		
EXT1		
EXT2		
EXT3		
EXT4		
EXT5		
EXT6		
EXT7		
EXT8		
Digital Output sub-menu		
CPU1		
CPU2		
CPU3		
CPU4		
MDURELAY1		
MDURELAY2		
MDURELAY3		
EXT1		
Table page 6 of 9		

Variable / Menu	Value	Value
EXT2		
EXT3		
EXT4		
EXT5		
EXT6		
EXT7		
EXT8		
EXT TOTAL PULSE		
DIGIOUT MAP		
Setpoint Input sub-menu		
SOURCE		
AINVALUE-%		
AIN MIN-%		
AIN MAX-%		
DEADBAND-%		
Analog Output sub-menu		
AOUT NUM		
FUNCTION		
AOUT VALUE		
AOUTMIN		
AOUTMAX		
DEADBAND		
Modbus I/O sub-menu		
ADDR. 80		
ADDR. 81		
ADDR. 82		
ADDR. 83		
Loader Menu		
LOADER FUNCTION		
Table page 7 of 9		

Variable / Menu	Value	Value
MAX LOAD TIME		
SHUTDOWN TIME		
DISCHARGE TIME		
VALVE CLOSE TIME		
HCU Loader		
Refer to Manual 0290023601		
System Menu		
Communication sub-menu		
HOST PROT		
HOST FILE		
K-PORT 1 PROT		
BAUD RATE		
K-PORT 2 PROT		
BAUD RATE		
CONFIG MODE		
CONFIG PORT		
Parameter Backup sub-menu		
PASSWORD		
Security Menu		
PRODUCT CHANGE		
CALIBRATION		
ALARM		
TUNING		
REFILL		
SCALE		
MACHINE SET-UP		
I-O SET-UP		
LOADER		
LSR / HCU LOADER		
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Variable / Menu	Value	Value
SYSTEM		
FDR BEING VIEWED		
TOTAL KEY		
SP ACCESS		
KEYS		
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