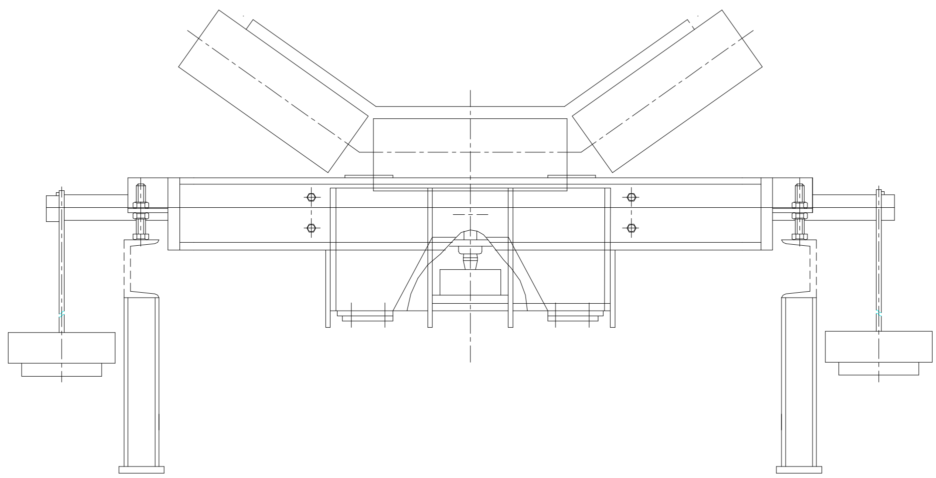
BMP 型电子皮带秤

BMP Type Belt Weigher

使用、安装、维护手册

Operation, Installation & Maintenance Manual



深圳市科尔达电气设备有限公司

SHEN ZHEN KERTA ELECTRIC EQUIPMENT CO.,LTD.

⚠注意事项
1、请在使用之前，仔细阅读本使用说明书，理解使用方法后正确使用。 2、本说明书已包含产品相对应控制仪表操作使用方法。

目 录

第一章、基本结构与工作原理

1、概述

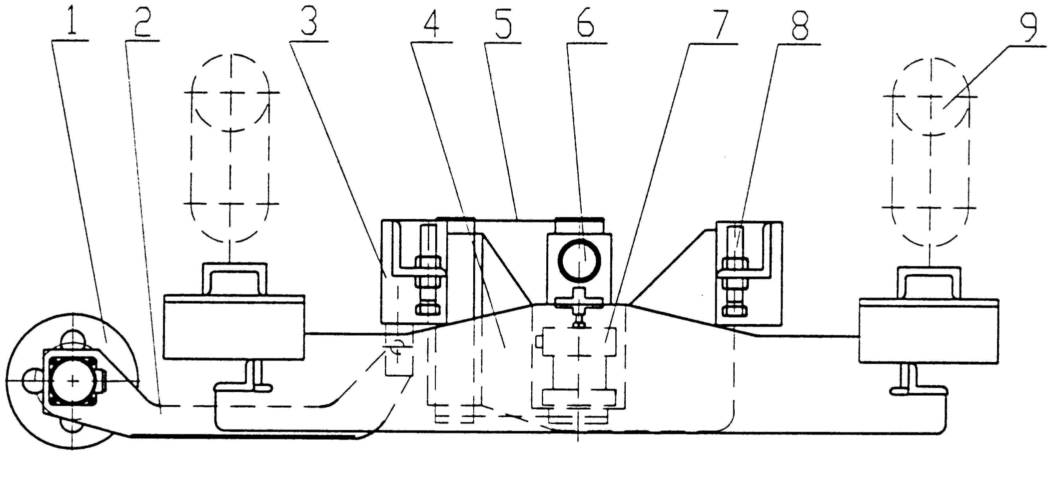
BMP 型电子皮带秤是与皮带输送机配用的一种连续称量设备，它已广泛应用于建材、冶金、矿山、化工、港口等工业领域，适合于用皮带输送机输送非粘性散粒状的称量。

2、基本结构

BMP 型电子皮带秤由机械秤体与称量仪表两部份组成：

a）机械秤体

机械秤体由称量框架、称重传感器和测速装置构成，如下图：



1.测速装置　2.摆杆　3.横梁　4.称量装置　5.簧片

6.砝码支撑杆 7.称重传感器　8.调整螺钉　9.称量托辊

·称量框架：称量框架可直接安装在皮带输送机的桁架上。由调整钉可以方便地将称量框架的安装校直或校水平，称重框加上有一个安装在栋梁上的坚固的承重机构，装有称量托辊支架的称量装置通过二组平行簧片的支点与之相连，输送皮带称量段上的物料载荷，通过称量托辊与称量装置直接作用于称重传感器上。

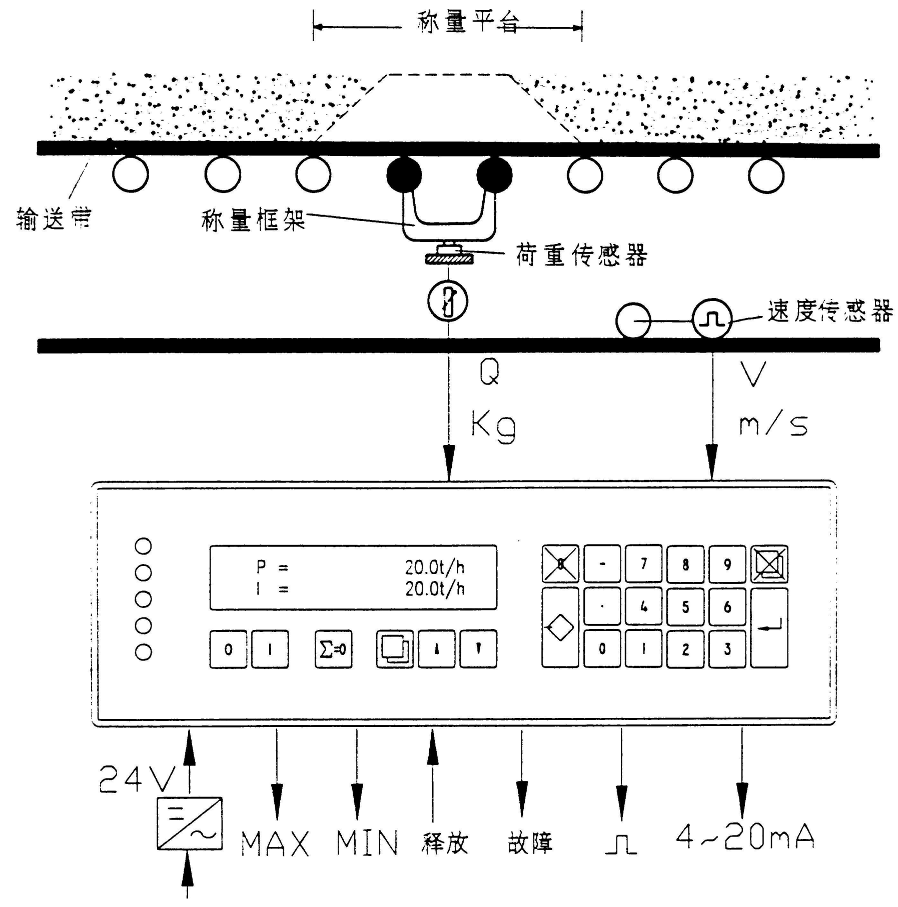
·称重传感器：称重传感用四只螺钉水平固定在称量框架上，它是电子皮带秤在称量输送带上物料的过程中力与电量转换的关键部件，选用了灵敏度高，密闭性好，气压补偿，防水防腐蚀的高精度的称重传感器。

·测速装置：速度传感器与测速成轮连成一体，它们通过摆杆与一笔勾销量框架的承重机构用绞链联接，靠测速装置自重使测速轮压在输送皮带上，当输送皮带运动时，带动测速轮转动，由速度传感器发出脉冲信号。

b)称重仪表

称重控制仪选用 INTECONT PLUS 微机称重器，称重器装在一个披挂式控制箱内，称重器内有三块基本功能卡，面板上有荧光显示窗口屏和 22 个触摸键，基本功能卡包括 CPU 卡、A/D 与 I/O 卡、键盘显示卡。

3、工作原理



工作原理

称量平台

输送皮带称量段（又称称量平台）上的物料经过称量框架时皮带上物料载荷直接作用到称重传感器上，称重传感器提供一个与皮带载荷成正比的电压信号 Q，输送皮带在运转过程中，测速装置上的速度传感器提供一个代表皮带速度的脉冲信号 V。称重器将代表载荷与速度的信号转换成数字信号相乘，即得到物料流量 I，皮带输送机上输送的物料累积量 Z，则由流量对时间的积分来确定。计算公式为：$I=QV$　　$Z=\int Idt$

式中：	I	物料流量	t/h 或 kg/s
	Q	单位长度皮带载荷	kg/m
	V	皮带运行的速度	m/s
	Z	某段时间内的累计量	kg；t

第二章、技术参数与性能

1、称量范围：5～500t/h

2、称量误差：±1.0%

3、允许皮带运行速度：＜2.5m/s

4、物料粒度：＜100mm

5、配用皮带机型号：TD72，TD75，ZJT1-86

6、皮带运输机倾角：＜20°

7、称重信号测量范围：0～30mA

8、速度信号测量范围：＜2700Hz

9、一次信号传送距离：＜500m

10、输入输出信号标准：0/4～20mA

11、仪表工作电源：220V　50Hz ，24V（DC）　＜1A

12、使用环境：机械秤体：-30℃～70℃

仪　　表：-5℃～45℃

13、具有校正程序，能自动校正皮重、量程。

14、有自动标定系统，稳定称量精度。

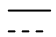
15、仪表自动监视运行工况参数，有事件报警显示。

16、有停电保持数据功能。

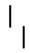
第三章、操作使用

1、称量仪表面板上指示灯、键盘与显示窗口

a)指示灯（五个）

 绿灯，电源正常

 绿灯，CPU 正常，就绪待用

 红灯，报警时闪亮

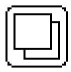
MIN 红灯，下限报警

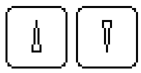
MAX 红灯，上限报警

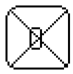
b)键盘（22 个）

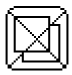
O | I 停止/起动

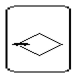
Σ=0 计数器复位

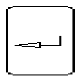
 调用功能分配器或事件信息

 选择键，选择上页或下页的显示内容

 确认事件信息或删除输入值

 中断功能，中止输入，退出功能分配器

 准备输入

 确认输入，确认显示的功能

0 ~ 9 数字键，输入参数值

– · 符号与小数点

c)显示窗口

窗口上部，左侧：运行信息

右侧：计数器 Z1 的值

窗口下部，左侧：事件信息

右侧：选择显示参数

I：流量 kg/h 或 t/h

V：皮带速度 m/s

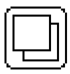
Q：皮带载荷 kg/m

2、功能分配器调用操作

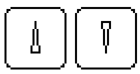
a）仪表的参数整定、校验等功能都是通过调用功能分配器来选择，其功能分配器如下：

```
Display Events（显示事件）
Display Check（自检）
Service Values（服务参数）
>0:Zero Set（零点）
Select Batch（选择批量）
Programming（程序）
Calibra Functions（校验检查）
Print FMZ（打印）

Read Parameters（读参数）
Enter Parameters（进入参数）
Land Default Par（恢复出厂值）
Print Paramelers（未用）
Print Stat Rep（未用）

TW:Tare（零点校验）
CW:Weight Check（重量检测（标定））
LB:Imp/Belt（皮带脉冲）
```

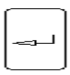
b）调用方法：



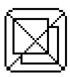
调用功能分配器



功能分配器中目录在显示区内滚动



确认调用的功能



退出，恢复正常显示

第四章、校验与标定

电子皮带秤安装就绪后，必须经过校验与标定才能投入正常使用。校验与标定才能投入正常使用。校验与标定要分别通过调用功能分配器中的校验（Calibra Functions）与调零（＞0：Zero Set）功能来进行。

1、校验前准备工作

- 输入皮带运行速度，校正称重器速度显示值。
- 输入 C02 参数值（皮带运行周期），可将周期设置为 1 或 2。
- 测量皮带速度平均值与称重显示的速度 V 值相比较，若不相符，修改 B04 参数值。

  B04（新值）= B04（原先值）•（Vg/Va）

  式中：Va　测量的速度值

  　　　Vg　称重器显示的速度值
- 测量皮带运行一周的时间（S），输入 C03 参数值。并根据随机提供的技术参数表，输 B 组和 C 组其它参数值。

2、脉冲数/皮带周期校验（LB）

(1)用功能分配器调用与操作方法，选择校验（Calibra Functions）

(2)根据显示提示，输入口令 07734，

(3)选择：“LB：IMP/Belt”

(4)起动 LB 程序，程序运行后，窗口上部显示皮带速度平均值；下部显示皮带周期内总脉冲数。

(5)确认运行结果（自动作为 D06 参数值）或中断运行，不取结果数值。

注：在下列条件下，应调用 LB 程序

- 初始校准
- 更换皮带
- 参数 B04、B05 改变

3、自重（皮带）校验（TW）

(1)用功能分配器调用与操作方法，选择校验（Calibra Function）

(2)输入口令 07734，

(3) 选择“TW：Tare”

(4) 起动 TW 程序，程序运行后，窗口上部显示自重值与上次自重值的偏差，以标称皮带负载%表示，下部显示总自重平均值为标称皮带负载的%数。

(5) 确认运行结果（自动作 D04 参数值）；中断运行不取结果数值。

注：测自重时，皮带上必须没有任何负载。

4、零点校验

TW 程序仅取得基本自重数值，而零点校验可取得皮带在运转过程中产生的自重与基本自重之间的偏差，用以校正当前测量结果。

(1) 调用功能分配器。

(2) 选择零校验功能（＞0：Zero Set）。

(3) 起动 Zero Set 程序，程序运行结果，窗口上部显示本次与上一次零校验的偏差，下部显示与基本自重零点偏差。

(4) 确认结果，称重器零点被校正。

(5)或 中止运行，不认其结果。

5、称量校验（标定：CW）

调用称量校验程序 CW，其目的是：将一已知的模拟检测重量置于称量框架（亦称称量平台）上，在 C02 确定的皮带运转周期数运转中，仪表所检测的称量结果与设定值比较，以评价其称量的准确度。

(1)将已知重量的标定砝码挂在砝码支撑杆两端，并将其检测重量设定值作为 C09 参数输入（参见参数及技术参数表）。

(2)调用功能分配器，选择校验（Calibra Function）。

(3)输入口令 07734，。

(4) 选择重量校验“CW”。

(5) 起动 CW 程序，程序运行结果，窗口上部显示在运行时间内的设定给料量，下部显示设定量与测量之比值 KOR。

(6) 中止退出程序。注：

- 误差＜1%：KOR=0.99…1.01　　　称重器正常。
- 误差＜5%：KOR=0.95…1.05　　　将 KOR 值为 D02 参数输入。
- 误差＞5%：KOR＜0.95 或 KOR＞1.05　C 参数或 D 参数输入不准确或秤体未调整好。

6、实物标定

用称量校验（CW）的方法，无法达到符合实际的完美效果，要得到高精度的称量结果，只能用实际输送的物料来进行测定，并对称重器 D02 参数值作相应的修正。

其方法：用斗或车收集电子皮带秤在一段时间内输送的物料，并准确称量，将称量的实际值与称重器显示的读数值（Z1）相比较，若不相符，则修改 D02 参数值。

D02（新值）=D02（原先值）•（Za/Zg）

式中：Za：称量的物料实际值

　　　Zg：称量器显示的物料值

注：校验前 D02 参数值一般系统设置为 1.0。

第五章、系统参数

参数是具有可变特性的数据，利用这些数据可以使系统运行时与更适合现场工况要求，所有参数出厂时设有预定值，这些都有是有用的建议值。参数被划分为 A…Q 功能组，字母后的数字是参数的序号，参数分为数值和选择项两种类型。

1、读参数

选程序功能（Programming） 进入下显示区

确认

选读参数功能（Read Parameters）

确认

选择参数功能块

确认

选组内参数并确认

按一次此键，返回到选参数组：再按一次，回到工作状态显示。

2、输入和修改参数

调分配功能

选程序功能进入下显示区

确认

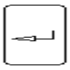
选输入参数进入下显示区（Enter Parameters）

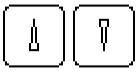
确认

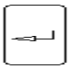
07734 输入口令并确认

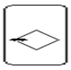
显示参数组 A 和信息 S5（“口令”有效）

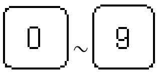
选择参数组

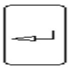
 确认

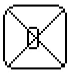
 选参数序号

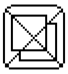
 确认

 准备输入和修改参数

 输入参数值

 确认

 删除单个数值

 中断输入

3 、装入缺省值

调用此功能后，仪表内参数恢复初始状态。

4、参数表

A 组　对话状况

A01 语言　　英语

A02 单位　　 SI

显示和参数的输入从 SI 单位制转换为美式单位制。

B 组 额定数据

B01 流量单位　　 – – –kg/h

可选 t/h，最多选四位小数，kg/h 同 t/h 格式一样。

B02 额定流量

范围：0.002～99999.9t/h

用于极限值和服务显示的标准化。

B03 速度有效

可选 YES 或 NO，不带速度测量的选 NO。

B04 速度传感器特征值

范围：10.00～100,000,0I/m，速度传感器在皮带每运行一米时所发出的脉冲数。

B05 额定速度

范围：0.0100～10.000m/s，用于极限值的参考值。

B06 启动源

可选 DE，DE+

DE：数字输入“释放”。

DE+T：键盘、数字输入和串行接口

DE+V：皮带速度高于 F11 设定的值

B07 设定值源

出厂值：TAST

可选参数：键盘；模拟

B08 外部设定值有效

出厂值：YES

可选参数：YES；NO

B09 负载传感器工作

出厂值：YES

可选参数：YES；NO

B10 FMZ1 单位

范围：t 可有 0～3 位小数，t＊10，t＊100

B11 FMZ1 脉冲宽度

给外部计数器的输出脉冲宽度，范围 50～1000ms

B12 FMZ2 单位

B13 FMZ3 单位

见 B10，用于计数器 3

B14 亮度调节

出厂值：1 LEVEL

可选参数: 1 LEVEL; 2 LEVEL; 3 LEVEL; 4 LEVEL

C 组 校验和计算数据

C01 电源频率

出厂值：50Hz

可选 50Hz 或 60Hz

C02 皮带周期数

范围：1～100，确定调零、除皮和称重校验的运行时间。不用于自动调零。

C03 皮带周期时间

范围：1.0～9999.0s ，确定“Imp/h 皮带周期”程序的运行时间，一般选皮带运行一圈的时间。

C04 L/C 灵敏度

范围：0.5000～9.9999mA，L/C：称重传感器

C05 L/C 额定负荷

范围：0.5000～22000.0kg，称重传感器的额定负荷。

C06 有效平台长度

范围：0.1000～50.000m

C07 杠杆比

范围：0.0100～2.0000，称重传感器与称重托辊负荷之比。

F=C07·Q　Q：平台负荷，F：称重传感器负荷。

C08 角度 a

范围：0.0～25.00degr，如果称重传感器垂直地安在皮带下，此角即为秤纵向中心线的倾角。

C09 砝码重量（检测重量）

范围：0.0～25.00dg，用砝码替代物料压在平台上的负荷。

D 组 校验结果

D01 额定皮带负荷

非输入量，由 B02 和 B05 计算得到。

D02 校正范围

范围：0.5000～2.000，该参数影响皮带负荷 q 的测量，q（校正后的）= q（测得的）·D02。

D03 总的皮带重（自重）

非输入值，总皮重=基本皮重＋皮重校正

D04 基本皮重 N

非输入值，最大 10000kg/m，它是自重校验（TW）的结果。

D05 自重校正 T

非输入值，最大正负 1000kg/m，它是零点校验的结果。

D06 皮带周期码

非输入值，最大 9E6，是“Imp/Belt Circuit”运行结果。

E 组 模拟输出

E01 AA 源

可选取：I（流量）、Q（皮带负荷）、V（皮带速度）

E02 AA 的最小值

范围：0.00～20.00mA，E01 的零点输出电流。

E03 AA 的极限

范围：0.00～10000.00mA，额定输出电流。

F 组 极值

如果测量数据低于最小值则输出 L1～L4 信息，高于最大值输出 H1～H4 信息。

F01 最小值

可选：I MIN、Q MIN、V MIN 其中一个。

F02 最大值

可选：I MAX、Q MAX、V MAX。

F03 流量最小值 IMIN

范围：-10～200.0

F04 IMIN 的事件等级

可选：警告 1、警告 2、忽略、报警。

F05 流量最大值 IMAX

范围：-10～200.0%I，参考 B02 值

F06 IMAX 事件等级 H1

可选：同 F04

F07 皮带负荷 QMIN

范围：-10～200.0%Q，参考 D01 值

F08 QMIN 事件等级 L2

F09 皮带负荷 QMAX

范围：-10～200.0%Q，参考 D01 值

F10 QMAX 事件等级 H2

可选：同 F04

F11 速度最小值 VMIN

范围：-10～200.0%V，参考 B05 值

F12 VMIN 的事件等级 L3

可选：同 F04

F13 速度最大值 VMAX

范围：-10～200.0%V，参考 B05 值

F14 VMAX 事件等级 H3

可选：同 F04

G 组 滤波设置

G01 流量显示

范围：0.0～600.0s

G02 流量模拟输出

范围：0.0～600.0s

G03 流量串行接口

范围：0.0～600.0s

G04 皮带负荷显示

范围：0.0～600.0s

G05 速度显示

范围：0.0～600.0s

G06 传感器滤波

范围：0.0～600.0s，适用于所有功能和随皮带负荷而定的显示。

G07 皮带跟踪时间

范围：0.0～2000.0s

停机后，计数器继续计数的时间。

H 组 未用

I 组 批量方式 仅在带有选择卡时考虑

J 组 打印格式（略）

K 组 内部运行

K01 电气运行

范围：0～10000h，设置电气工作时间。

K02 电气维护事件 S4

可选：警告 1、警告 2 或忽略。电气工作时间超出了 K01 的规定。

K03 运行 T 大于 Tmin

范围：0～10000h，设置电机工作时间。

K04 运行维护事件 S3

可选：同 K02，皮带总的运行时间超过了 K03 的规定。

K05 SPC 时间

范围：0.00～24.00h，获得内部服务值，皮带负载无负荷运行时间。SPC=统计过程控制。

K06 SPC 滤波

范围：0.00～24.00h

L 组 串行接口　X7（略）

M 组 串行打印接口 X8（略）

N 组 喂料机控制（略）

O 组 未用

P 组 未用

Q 组 事件

Q01 电源故障　　　　E1

可选：报警、警告 1、警告 2、忽略。

Q02 存贮器故障　　报警　　S1

仪表不能操作。

Q03 速度输入 GA1

可选：报警、警告 1。输入频率低于 5Hz 或超过 2700Hz，要求 B03= YES。

Q05 GA1 错误

可选：报警、警告 1、警告 2、忽略。短路或线断。

Q07 Imp/Belt 错误　　　E4

可选：忽略、报警、警告 1、警告 2。

Q08 L/C 输入

可选：报警、警告 1、警告 2。称重传感器线接错或没接。电源＜19V

Q09 无释放

可选：忽略、警告 1、警告 2、报警。

无释放信号，控制设置为 STOP。

Q10 L/C 输入大于最大值

可选：报警、警告 1、警告 2。称重传感器负荷超过 115%的额定负荷。

Q11 L/C 输入小于最小值

可选：报警、警告 1、警告 2。称重传感器小于 3%的额定负荷。

Q12 口令有效

警告 2，传送指令输入后，显示 S5 两分钟。

第六章、系统服务值

服务值表中有详细的系统信息，调用查看时不会影响称重功能。

1、版本号：例：FBW0200-14

2、设备号：F-Nr=G××××

3、选择卡：NO（不带选择卡）、V03、V04（装有选择板）

4、日期和时间

5、继电器输入的开关条件。

6、输入的开关条件。

7、EL=xxxxh，电源接通时间。

8、ED：＞0=XX：yyh，上次除皮，或手动或自动调零到现在的运行时间。

9、ED=xxxh，秤和输送皮带的运行时间。

10、速度 1=xxxxHz ，速度传感器输入频率。

11、aW= xx、yyy%，称重传感器负荷与单位传感器额定负荷的百分比。

12、vap-roh=xxxx，称重传感器放大器的非标准化输出。

13、WZ-roh=xxxx,，称重传感受器放大器的非标准化输出。（全部）

14、皮带空转打滑 S= xxxx，yyyyy%，单位总皮带长度的百分比。

15、皮带跑偏 tr=xx，yy%

16、平均极限值=xxx，yy%，单位额定流量的百分比。

17、比例 var=xxx，yy%，单位额定流量的百分比。

18、最大皮带负荷 QMAX= xxx%

19、低负荷区间 TQ＜MIN=xxx%

20、最后一次除皮，T　xxx，yy%，单位额定皮带负荷的百分比。

21、AA=xx，yymA，模拟输出电流。

22、AO：E　yy　xxxx 外部累加器脉冲输出。

第七章、事件信息

称重器的所有重要功能都受到内部监视，如有故障，将被作为事件信息代码显示在下部左侧，如果同时发生几个事件，其优先级排列为：报警、警告 1、警告 2。

按可以确认事件，调用“显示事件”功能可以查看事件信息文件。

1、系统信息 S

S1：内存故障

存贮的参数和程序被周期性地检测。如有错误，仪表不能进行操作。

S2：无释放

外部释放信号丢失，仪表不能启动。

S3：运行时间大于最小设定时间

皮带输送和测量的时间超过预定值，见参数 K03，K04。

S4：内部电气运行

INTECONT 仪表通电时间，如果需要，进行必要的维护工作。

S5：口令有效

口令输入后两分钟内有效，仪表可从额定操作转到校验和服务功能。

2、电气 E

E1：电源故障

电源故障或线断路，这个期间不能计量流量。

E2：GA1 短路

速度传感器线短路或断路，仪表不能操作。

E4：Imp/Belt 短路

皮带周期传感器短路或断路。见参数 Q07。

3、校验 C

C1：L/C 输入

称重传感器线断或接线错误或供电电源过低。见参数 Q08。

C2：GA1 输入

速度传感器输出频率低于 5Hz 或超过 2700Hz。见参数 Q03。

C8：空转故障（打滑）

皮带周期传感器测得输送皮带长度已改变。

4、极大值 H

H1：流量高于最大值。

实际流量超过了预定的极大值。

H2：皮带负荷高于最大值。

实际皮带负荷超过了预定的极大值。

H3：速度高于最大值

实际皮带速度超过预定的极大值。

H4：称重传感器输入值高于最大值。

5、极小值 L

L1～L4 依次对应于 H1～H4，只不过 L1～L4 是超过了预定的极小值。

第八章、安装

1、安装位置的选择

为了方便安装和调试，保证系统称量的精度，电子皮带秤最好安装在皮带运输机的水平段，而且，水平段的长度大于七米（八组托辊的距离），把称量框架（秤体）安装在中间两组托辊的位置，保证称量框架前后至少各有三组水平托辊。

2、安装顺序与要求

（1）准备

•确定安装位置之后，取下运输机上该八组托辊，逐个测量其锥度和径向跳动。要求锥度小于 0.1mm，径向跳动小于 0.2mm。如超差应对其进行修复或更换，八组托辊直径应一致，选择其中几何尺寸最好的两组作称量托辊。

•检查皮带运输机桁架的刚性，如果刚性不够，应在安装位置的部位予以加固，并且应改进运输机工况，消除其在运转中出现的皮带上下跳动现象。

•取下中间两托辊的支架组。

（2）安装（参见安装及外形尺寸图）

•将称量框架整体吊装到选定的安装位置，按安装图准确测量好安装部位，称量框架中心线与输送机中心线对称，将调整螺钉帽焊接到输送机桁架上。

•将从输送机上取下的两组称量托辊支架组焊装到称量框架的称量托辊支架上。

•将几组经修复选好的托辊装到相应的支架上。

•调整称量框架上的调整螺钉，将称量框架校平校正，使称量托辊的水平辊母线平面应比输送段托辊上母线高 5mm 左右，输送段托辊的母线也应各在同一平面上。

•安装测速装置。

•取下固定支架与称量装置之间的小防护角铁，使称量装置的承重螺钉压在称重传感器上。

•称重器仪表为壁挂式安装，先将四只安装支架固定在仪表箱体上，然后按附图尺寸要求安装在控制室内。

•按接线图进行现场接线，接线端子在仪表箱内，导线应通过仪表箱底部护线导管穿入。

3、按随机的技术参数表输入参数，并按校验与标定方法进行调试。

第九章、维护

一、经常清扫称重传感器，称量装置和平行簧片上的灰尘。

二、经常检查测速装置摆杆及测速轮的活动状况，应保证其活动自如，防止测速轮上胶带脱落，测速轮应正常压在输送机的输送带上。

三、定期检查皮带输送机的张紧装置，保持皮带张力恒定平衡。

四、修理或较长时期停止工作时，将称量框架上小防护角铁旋紧，将承重螺杆离开称量传感器，以保护其不被损坏。

五、防止人或重物停留在称量段上，以免传感过载被损。

六、仪表的修理检查应由经过培训的技术员或专业仪表工来处理，除定期清扫灰尘外，不应随意打开仪表箱，更不要拆下仪表，让不具备维修能力的人员维修。

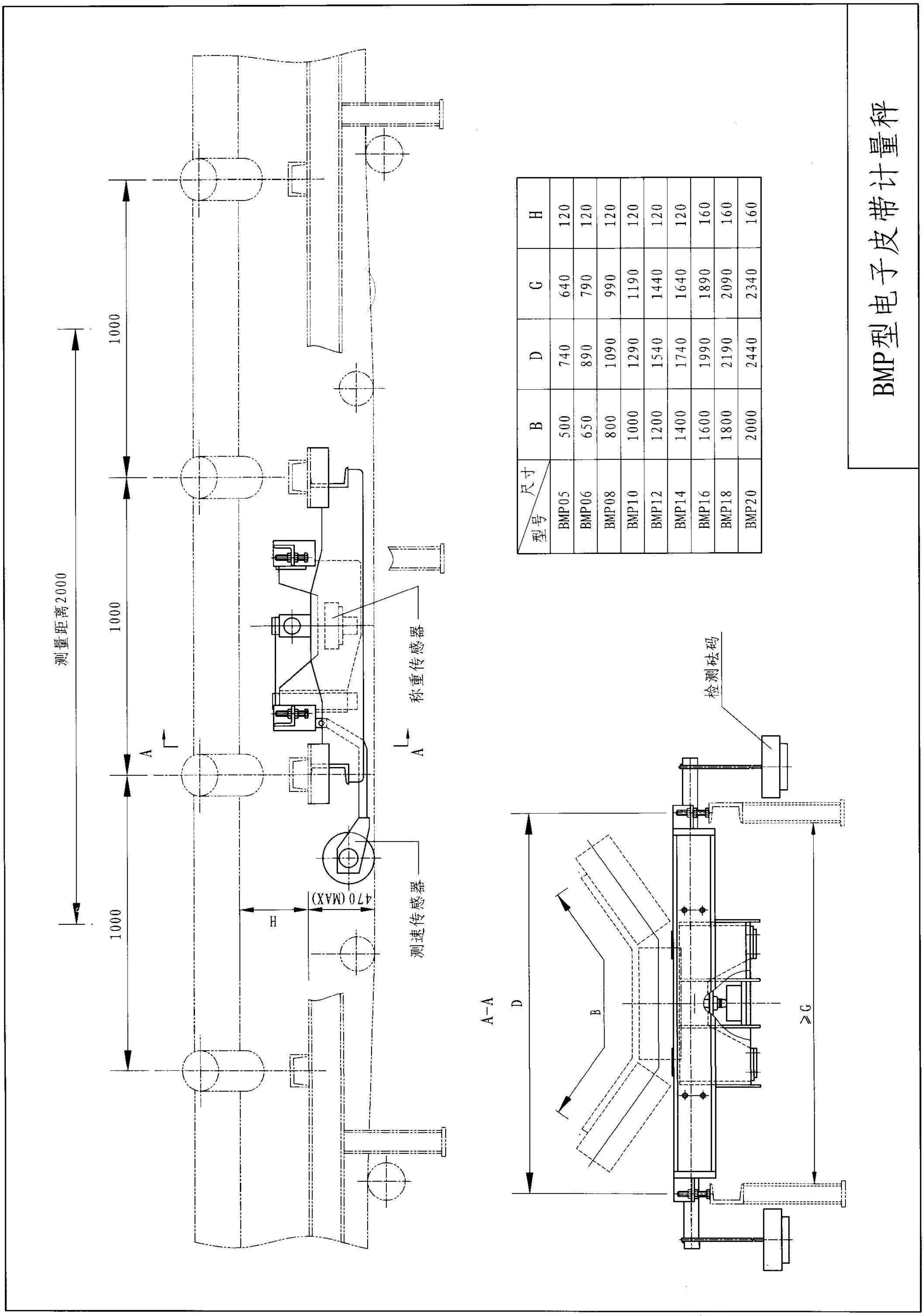
七、每台电子皮带秤都随机备有一份技术参数表，内有该设备的有关数据与参数，更换零备件时，请按参数表的要求更换同型号零备件。

第十章、技术参数及图纸

1、 BMP 型电子皮带计量秤外形尺寸图

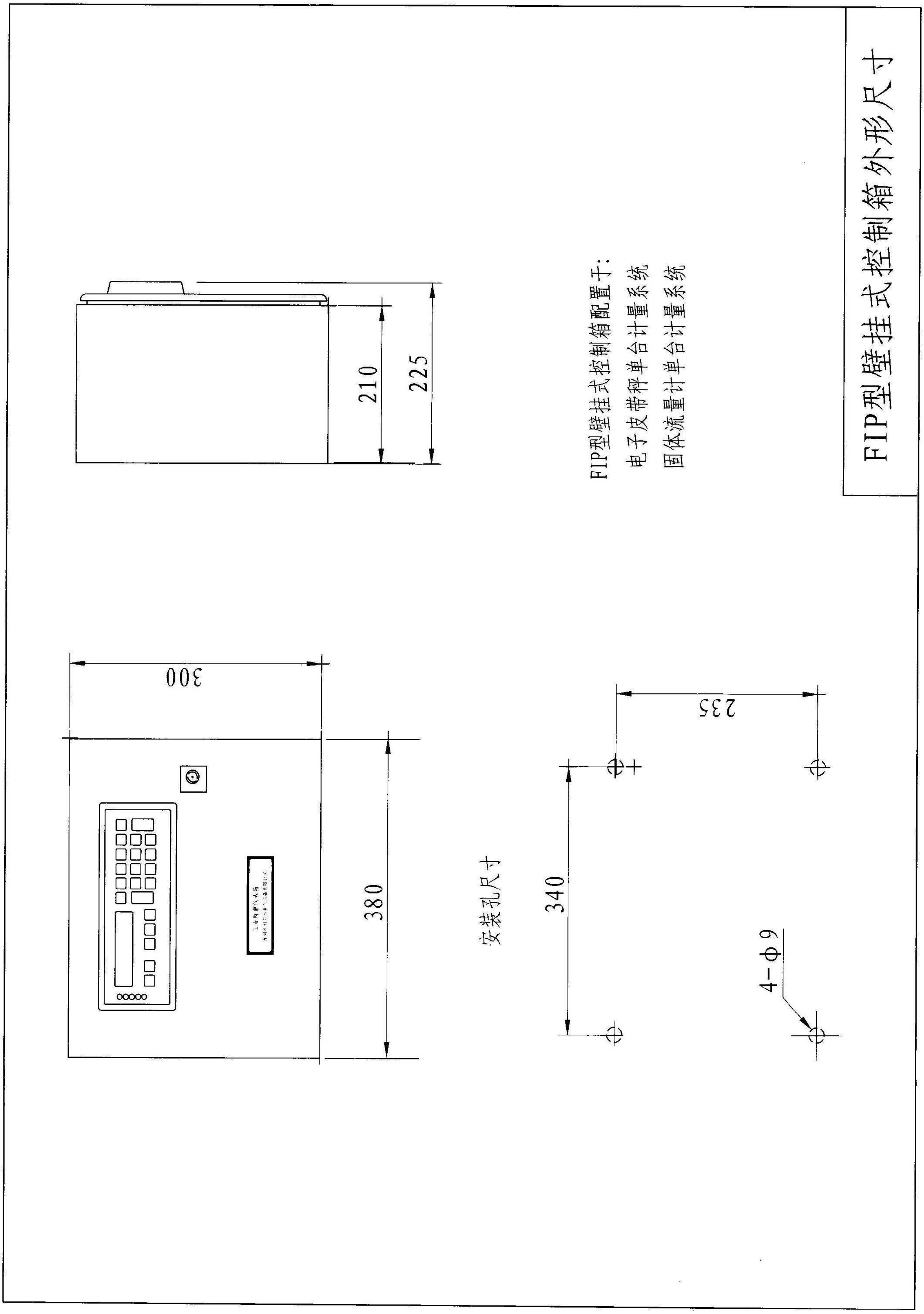
2、 FIP 型壁挂式称重仪表控制箱外形图

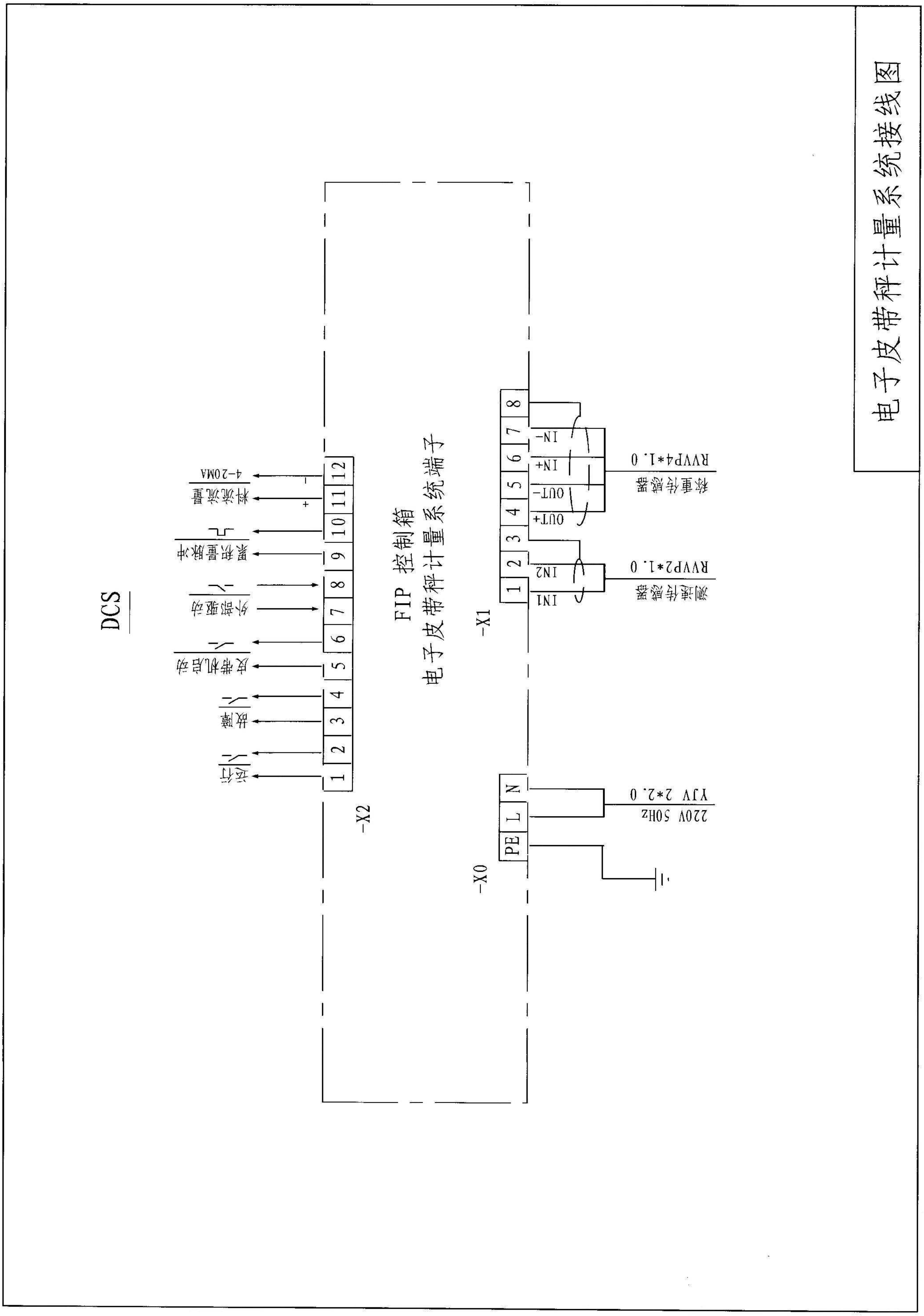
3、 电子皮带秤计量系统接线图



BMP型电子皮带计量秤

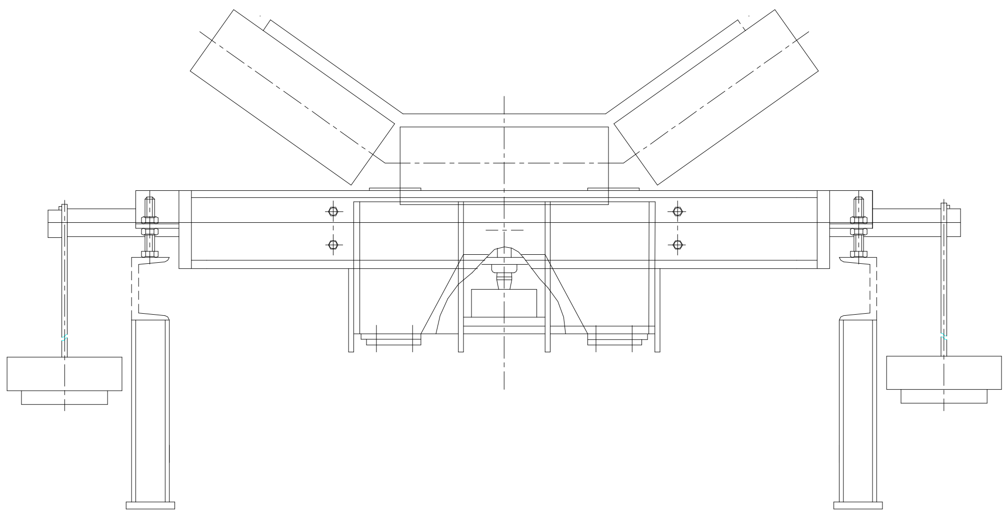
型号 \ 尺寸	B	D	G	H
BMP05	500	740	640	120
BMP06	650	890	790	120
BMP08	800	1090	990	120
BMP10	1000	1290	1190	120
BMP12	1200	1540	1440	120
BMP14	1400	1740	1640	120
BMP16	1600	1990	1890	160
BMP18	1800	2190	2090	160
BMP20	2000	2440	2340	160


FIP型壁挂式控制箱外形尺寸
FIP型壁挂式控制箱配置于：
电子皮带秤单台计量系统
固体流量计单台计量系统
210
225
300
380
安装孔尺寸
340
235
4-Φ9


电子皮带秤计量系统接线图
DCS
FIP 控制箱
电子皮带秤计量系统端子
-X2
-X1
-X0
运行
故障
皮带机启动
外部驱动
累积量脉冲
料流流量
4-20MA
测速传感器
RVVP2*1.0
称重传感器
RVVP4*1.0
IN1
IN2
OUT+
OUT-
IN+
IN-
PE
L
N
220V 50Hz
YJV 2*2.0

BMP Type Belt Weigher

Operation, Installation & Maintenance Manual



SHENZHEN KERTA ELECTRIC

EQUIPMENT CO.,LTD.

⚠Caution
Read through this instruction manual and be familiar with the handing method for correct use。

Table of Contents

Chapter 1. Basic Construction and Operating Principle

1. Overview

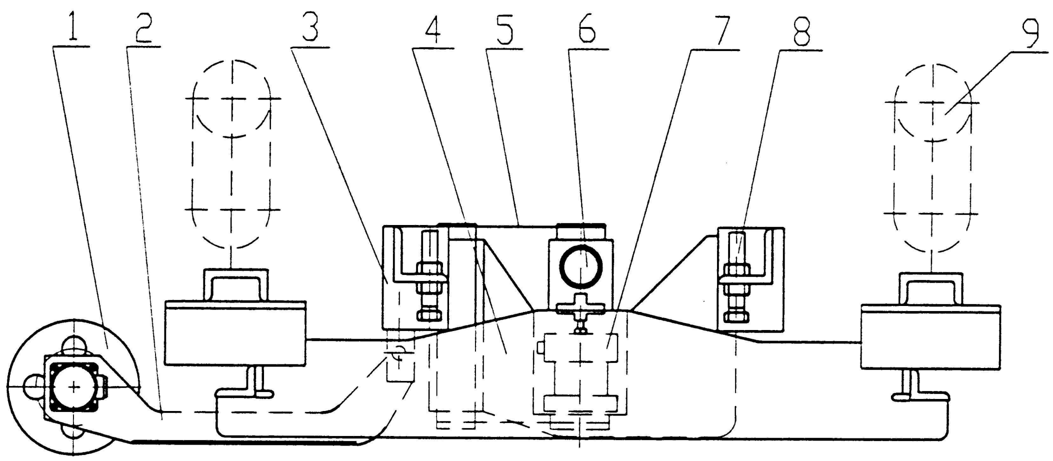
Type BMP microcomputer controlled belt weigher is designed as a continuous measurement system equipped with belt conveyor. . It is widely applicable for construction, metallurgy, mine, chemical industry and port industrial fields etc. and suitable for measurement of non-sticky lump, relax grain material on belt conveyors

2. Basic Construction

Type BMP electric weigher consists of mechanical scale body and weighing device.

(1). Mechanical scale body

It includes weighing frame , load cell and speed measuring device. It is showed as the following:



1.Speed measuring device	2. Swing pole	3. Crossbeam
4. Weighing device	5. Leaf spring	6. Weight supporting pole
7. Load cell	8. Adjustable screw	9. Multiple idlers

◆ Weighing frame:

Weighing frame can be directly installed on the frame of belt conveyor. It is convenient to adjust weighing frame vertically or horizontally by adjustable screws. There is a strong weight supporting structure on the crossbeam. Through the fulcrum of two groups of parallel leaf springs ,it is connected to the weighing device with multiple idlers supporter. Materials loaded on the weighing section of conveyor belt directly act on the load cell through idlers and weighing device.

◆ Load cell

Load cell is horizontally fixed on the weighing frame by four screws. It is a key part for converting force to electric signal during belt weigher measuring materials on the conveyor belt. The load cell selected for usage is high in sensitivity and precision, excellent in air sealing performance and pressure compensation, and effective in prevention from water and corrosion.

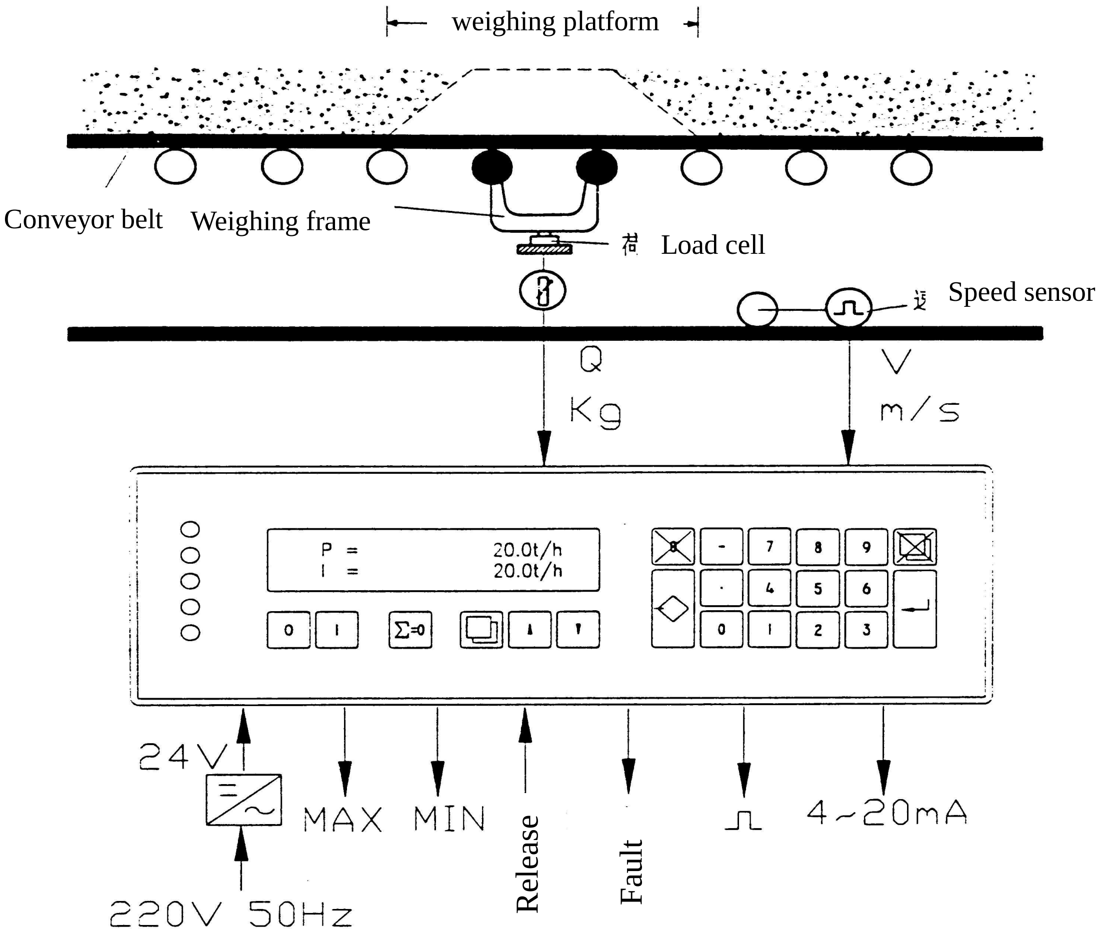
◆ Measuring speed device:

The speed sensor and speed measuring wheel, formed as one compact unit, are connected through a swing pole and weight supporting structure of weighing frame by twist chains. Depending on the self tare of measuring speed device, the speed measuring wheel is pressed on the conveyor belt. When conveying belt is running, it brings speed measuring wheel to rotate, and pulse signal is sent out by speed sensor.

(2). Weighing unit:

INTECONT PLUS microcomputer weighing unit is adopted as weighing controller. It is installed in a wall-mounting control cabinet. There are fluorescent display screen and 22 tough keys on the front panel. Basic function cards include CPU, A/D, I/O, and keyboard display cards.

3. Operating Principle



When material on the weighing section of conveyor belt (called also as weighing platform) is passing through a weighing frame, material load directly acts on the load cell ,which provides a pressure signal Q proportional to the belt load. While the conveyor belt is running, the speed transducer of the speed measuring device sends a pulse signal V which represents belt speed. The analog signals representing respectively load and speed are converted into digital signals and multiplied with one another to yield a material feed rate I by the weigher’s converter. Materials accumulated amount Z conveyed by the belt is determined by integral of feed amount versus time .

Formula is : $I = QV$

$$Z = \int I dt$$

where: I – material feed rate

Q – belt load per length

V – belt running speed

Z – accumulated amount for a certain time

Chapter 2. Technical Data and features

1. Weighing range: 0.1…500t/h
2. Weighing error: ±1.0%
3. Permitted belt speed: <2.5m/s
4. Material grain size: <100mm
5. Suitable belt types: TD72, TD75, ZJT1 – 86
6. Inclination angle of belt conveyor: <20
7. Weighing signal measurement range: 0…30mv
8. Speed signal measurement range: <2700Hz
9. Transmitting distance of one signal : <500m
10. Input and output signal standard: 0/4…20mA
11. Instrument power supply: 220v 50Hz, 24V (DC) <1A
12. Operation environment

    Temperature: Mechanical body – 30…70 ℃

    Instrument – 5…45 ℃
13. It is loaded with correcting programs for tare, weight and measurement range automatic correction.
14. It is provided with self – calibration system to keep measuring precision stable.
15. Instrument supervises automatically operating parameters and displays events and alarms.
16. It features a function of keeping data when power is off.

Chapter 3. Operation

1. Signal Lamps, Keyboard and Display on the Panel

(1) Signal lamps (5 Leds)

(Green) POWER OK.

(Green) CPU OK, ready for operation.

(Red) ALARM with flashes.

MIN (Red) LIMIT VALUE

MAX (Red) LIMIT VALUE.

(2) Keyboard (22 keys)

O | stop or Start summing counting

Σ=0 Reset counter and enter counter No. 1 used.

Call function distributor or event text.

Scroll to select displayed text of previous or next page

Acknowledge event messages or delete entry.

Abort function ,stop entry, and exit function distributor

Prepare entry

Acknowledge selected entry and start function.

0 ~ 9 Number keys to enter parameters

– · Signs and decimal point

(3) Display window

Upper display, Left: Operating messages

Right: Value of counter Z1

Lower display, Left: Event messages

Right: Selected displays, such as:

I : Feed rate kg/h or t/h

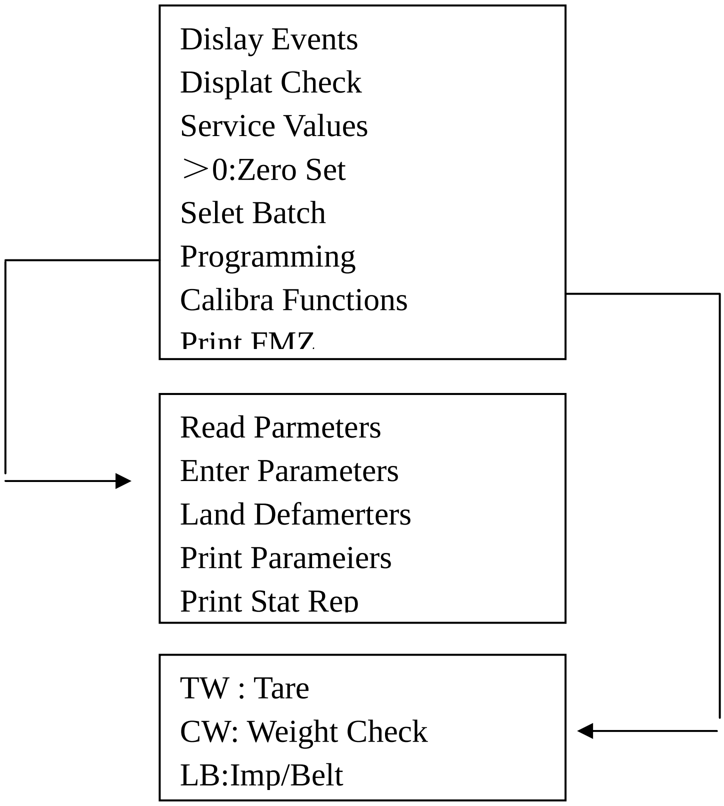
V: Belt speed m/s

Q: Belt load kg/m

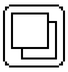
2. Call Function Distributor

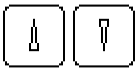
(1)Parameters setting and calibration are all achieved by calling function distributor.

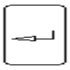
Move through function distributor to find follows:

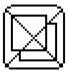


(2) Calling sequence

 Call function distributor

 Scroll function titles in the display field.

 Acknowledge a function called

 Exit, return to normal display

Chapter 4. Calibration and Setting

After installation, the belt weigher must be calibrated and set before it is put into application. By calling the Calibra Functions and > 0: Zero Set functions in the function distributor, the calibration and parameters setting can be carried.

1. Prerequisites before Calibration

(1) Enter belt running speed and correct the display value

- Enter parameter C02 value (belt running circuit) and set circuits as 1 or 2.
- Compare the measured mean value of belt speed with the displayed speed V value. If they are different, correct parameter B04 value.

  B04 (New value) = (Former value) . (Vg/Va)

  Where : Va : Measured speed value

  Vg: Displayed speed value
- Measure the time (S) needed for the belt to run one circuit and enter it as the value of parameter C03. Enter other parameter values for block B and C listed in the parameter sheets which are attached to the belt weigher.

2. Impulses/Belt Circuit Calibration (LB)

(1) Call function distributor and follow the sequence to select "Calibra Function".

(2) Follow displayed indication , enter password 07734 and acknowledge with ↵.

(3) ↓ ↑ Select " LB: IMP/Belt".

(4) ↵ Start LB program. When the program is running ,

upper display shows mean speed of belt speed and lower display shows total impulses acquired in one belt circuit.

(5) Acknowledge result (acquire and store it automatically as parameter D06 value) or abort operation and result is not acquired.

Note:LB program should be called in following conditions:

- Initial calibration
- Replace belts
- Renew parameters B04 or B05

3. Tare Calibration (TW)

(1) Call function distributor and follow the sequence to select "Calibra Function".

(2) Enter passeword 07734 and acknowledge .

(3) Select "TW: Tare".

(4) Start TW program. When program is running, upper display shows the deviation of current tare value from previous tare result in % of normal belt load and lower display shows mean value of total tare in % of nominal belt load.

(5) Acknowledge result (acquire and store as parameter D04 value)

or abort operation and result is not acquired.

Note: When Tare is measured, the belt must be totally unloaded.

4. Set to Zero

Unlike the TW program setting which only acquires basic tare value, zero setting can acquire deviation of tare value while belt is running from basic tare value, so as to correct current measure result.

(1) Call function distributor .

(2) Select function “> 0: Zero Set”

(3) Start zero set program. Program is running to give results. Upper display shows the deviation of current zero setting from previous result and lower display shows basic tare zero point error.

(4) Acknowledge result and zero point of belt weigher is corrected.

(5) Abort operation and result is not acquired.

5. Chech with Check Weight (CW)

Call weight check program (CW) so as to evaluate the accuracy of weighing by way of putting a known simulated check weight on the weighing platform. During the belt running circuits set in parameter C02, compare the measured actual result with the set value.

(1) Hung the standard weight of a known wight value on both sides of the supporting balance beam. Then acquire and store the measured result in parameter C09 (Refer to data and parameter sheets).

(2) Call function distributor and select “Calibra Function”.

(3) Enter password 07734 and press

(4) Select weight check “CW”.

(5) Start CW program and see results. Upper display shows set value of feeding rate in an operating time and lower display shows ratio KOR of the setpoint and actual measurement result.

(6) Abort and exit CW program.

Note: 1) Error < 1%: KOR = 0.99 … 1.01 Weigher is OK

2) Error < 5% : KOR = 0.95 … 1.05 Enter KOR value in parameter D02

3) Error > 5% : KOR < 0.95 or KOR > 1.05 Values set for parameters C and D are not accurate or belt weigher was not well alighned.

6. Check with Material

Check or calibration with check weights (CW) can not reproduce the actual circumostances to perfection. Hightly accurate weighing results can be achieved only in various measurements with materials and then make subsequente corrections.

Procedure: Collect all material amount conveyed and weighed on the
belt weigher in a certain period of time in a hopper or a vehicle and then weigh it accurately. Compare the actually weighed value with the readings (Z1) displayed on the belt weigher. If the values are not the same, correct value set in parameter D02.

D02 (New value) = D02 (Previous value) . (Za/Zg)

Where: Za : Actually weighed material value.

Zg : Displayed material value from weighing on the belt weigher.

Note: The normal default was set to 1.0 for parameter D02 before calibration.

Chapter 5. Parameters

Parameters are changeable characteristic data used to match microprocessor to the actual requirements of application . All parameters are preset with default values. These are useful suggestions. The parameters are classified in functional blocks A to Q. Numbers after characters are serial number of parameters. Parameters are in two types, i. e. numeric and selection parameters.

1. Call Parameter Menu

Scroll function Programming into lower display field

Acknowledge

Select function Read Parameters

Acknowledge

Select parameter blocks

Acknowledge

Select through parameter numbers within a block and Acknowledge

Press once, return to select parameter blocks.
Press once more, return to setpoint display.

2. Enter or Correct Parameters

Call function distributor.

Scroll function Programming into lower display field

Acknowledge.

Select function Enter Parameters into lower display field

Acknowledge

0 7 7 3 4 Enter password and acknowledge

Display shows parameter block A and message.S5 signals “Password Active”

	Select parameter block.
	Acknowledge
	Select through parameter numbers within a block.
	Acknowledge.
	Prepare to enter or correct parameter value.
0 ~ 9	Enter value with number keys.
	Acknowledge
	Delete any single value.
	Abort entry.

3. Load Default Parameters

Parameters return to initial state when this function is called.

4. Parameters

Block A Dialog Behaviour

A01 Language ENGLISH

A02 Units SI

For displaying and entering parameters, SI units can be converted into the American units.

Block B Rated Data

B01 Unit of Feed Rate ---kg/h

Or select t/h, and select four unit decimals at most, form of kg/h is the same as t/h.

B02 Nominal Feed Rate

Range: 0.0020…99999.9t/h

Used for limit value and service displays

B03 Tacho Active

Range; YES or NO

Select No for no belt speed measurement.

B04 Charact. Val. Vs

Range: 10.00…100,000.0 I/m

Send pulse number by speed transducer while belt moves one meter.

B05 Nominal Speed

Range: 0.0100…10.000m/s

Reference value for limit values.

B06 START Source

Range: DE, DE + T, DE + V

DE: Enter numbers “release’

DE +T: Keyboard, enter numbers and serial interface.

DE + V: Belt speed exceeds F11 setpoint.

B07 Setpoint Source

Default: KEYB

Optional: KEYB or SER or ANALOG

B08 External Setpoint Active

Default: NO

Range: YES or NO

B09 W/S Active

Default: NO

Optional: YES, NO

B10 FMZ1 Unit

Range: t may own 0…3 unit decimals t*10 t*100

B11 FMZ1 Pulse Width

Range: 50…1000ms

Output pulse width to external totalizing counter.

B12 FMZ2 Unit

See B10, for counter 2

B13 FMZ2 Unit

See B10, for counter 3

B14 Regulate Lighteness

Default:1 LEVEL

Optional: 1 LEVEL；2 LEVEL；3 LEVEL；4 LEVEL

Block C　Calibration and Calculation Data

C01 Mains Frequency

Default: 50Hz

Range: 50Hz or 60Hz

C02 Belt Circuit No.

Range: 1…100

Determines running time of setting programs “Set to Zero, Tare, and Weight Check”. Does not apply to automatic zero setting.

C03 Belt Circuit Time

Range: 1.0…9999.0s

Determines measuring time for calibration program “Imp/Belt Circuit”. Normally, time is selected for one belt circuit.

C04 L/C Charac. Value

Range: 0.5…9.9999mV/V

L/C: Load cell

C05 L/C Rated Cap.

Range: 0.5000…22000.0kg

Rated load of load cell.

C06 Eff. Platf. Length

Range: 0.1000…50.000m

C07 Lever Ratio

Range: 0.0100…2.0000

Lever ratio between load cell and force transducing weighing idler of platform.

F = C07 . Q   Q = Platform load   F = Load cell load

C08 Angle a

Range: 0.0…25.00degr.

Inclination of longitudinal weigher axis, if load cell is mounted vertically to belt.

C09 Check Weight

Range: 0.001…22000.0kg

Block D   Calibration Results

D01 Nominal belt Load

No entry required. It is calculated and acquired from B02 and B05.

D02 Range Correction

Range: 0.5000…2.000   This parameter effects the measurement of belt load q.

q (Corrected) = q (measured) . D02

D03 Total Tare

No entry required. Total tare = basic tare + tare correction

D04 Basic Tare N

No entry required. Max. 10000kg/m. It is the result of Tare calibration (TW).

D05 Tare Correction T

No entry required. Max. + - 1000kg/m. It is the result of Set to Zero calibration .

D06 Belt Circuit Char.

No entry required. Max. 9E6. It is the result of Imp/Belt Circuit.

Block E   Analog Output

E01 Source AA

Range : I (Feed Rate),   Q (Belt Load),   V (Belt Speed)

E02 Elevation AA

Range: 0.00…20.00 mA,   Output current of zero point of E01.

E03 Limit Value AA

Range: 0.00…1000.00mA, Rated output current .

Block F Limit Values

If measurement value exceeds MIN threshold, event messages L1…L4 are outputs.

If measurement value exceeds MAX threshold, event messages H1…H4 are outputs.

F01 Limit Value MIN

Range: I MIN, Q MIN, V MIN, select one of them.

F02 Limit Value MAX

Range: I MAX, Q MAX, V MAX.

F03 Value for I MIN

Range: -10…200.0%I. Reference: feed rate B02.

F04 Event Class I MIN L1

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

F05 Value for I MAX

Range: -10…200.0%I. Reference : feed rate B02.

F06 Event Class I MAX H1

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

F07 Belt Load Q MIN

Range –10…200.0%Q. Reference: Nominal belt load D01

F08 Event Class Q MIN L2

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

F09 Belt Load Q MAX

Range –10…200.0%Q. Reference: Nominal belt load D01

F10 Event Class Q MAX H2

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

F11 Speed V MIN

Range –10…200.0%V. Reference: Nominal speed B05.

F12 Event Class V MIN L3

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

F13 Value for V MAX

Range: –10…200.0%V.   Reference: Nominal speed B05.

F14 Event Class VMAX   H3

Range: WARNING 1, WARNING 2, IGNORE, ALARM.

Block G Filter Setting

G01 I Display

Range: 0.0…600.0s

G02 I Analog Output

Range: 0.0…600.0s

G03 I Interface

Range: 0.0…600.0s

G04 Q Display

Range: 0.0…600.0s

G05 V Display

Range: 0.0…600.0s

G06 L/C Filter

Range: 0.0…600.0s

Suitable for all functions and display determined by belt load.

G07 Belt Tracking Time

Range: 0.0…2000.0s

Time counted by counter continuously after stop.

Block H Not indicated

Block I Batch Operation(Only being considered when option cards are adopted)

Block J Printer Setting (Omitted)

Block K Maintenance Int.

Not dedecated

Block L Serial Interface X7 (Omitted)

Block M Serial Printer Interface X8 (Omitted)

Block N Weighing Feeder Control (Not dedicated)

Block O Not indicated

Block P Not dedicated

Block Q Events

Q01 Power Failure E1

Range: WARNING 1, WARNING 2, ALARM, IGNORE

Q02 Memory Error S1

ALARM

Scale is out of operation when alarm.

Q03 Tacho Input GA1 C2

Range: WARNING 1, ALARM

Input frequency is less than 5Hz or exceeds 2700Hz

Prerequisite: B03 = YES

Q05 Error GA1 E2

Range: WARNING 1, WARNING 2, ALARM, IGNORE

Short circuit or cable breakage.

Prerequisite: B03 = YES

Q07 Error Imp/Blt. E4

Range: IGNORE, WARNING 1, ALARM

Q08 L/C Input C1

Range: WARNING1, WARNING 2, ALARM

Load cell cable connection is wrong or not connected.

Power supply < 19V.

Q09 No Release S2

Range: WARNING 1, WARNING 2, IGNORE, ALARM

No release signal. Control input STOP is set to STOP.

Q10 L/C Input > MAX H4

Range: WARNING 1, WARNING 2, ALARM

Load on load cell exceeds 115% of rated capacities.

Q11 L/C Input < MIN L4

Range: WARNING 1, WARNING 2, ALARM

Load of load cell is less than 3% of total load cell rated capacities.

Q12 Password Active S5

WARNING 2

Message S5 displays for 2 minutes upon entry of password.

Q13 Analog Active

Q14 Setpoint Limited

Chapter 6. System Service Values

There are detailed system messages in the service value table. Calling and reading them do not effect weighing function.

1. Version Number: e.g. FBW0200 – 14
2. Device Number: e. g. F-Nr. =G xxxx
3. OPTION Code: No (no or wrong option card)
   V05(option card available)
4. Date and Time
5. Switching Condition of Relay Outputs
6. Switching Condition of Relay Inputs
7. EL=xxxxh
   ON-time of power supply.
8. ED: >0=xx: yyh
   ON-time of last taring or automatic /manual zero setting to current operating time.
9. ED=xxxh
   ON-time of weigher or conveyor belt.
10. Tacho 1=xxxxHz
    Input frequency of speed transducer.
11. aw=xx/yyy%
    Percentage of load cell related to total rated capacities.
12. vap-roh=xxxx
    Unnormalized output value of load cell amplifier.
13. WZ-roh=xxxx
    Unnormalized output value of load cell amplifier(gross).
14. Belt slip s=xxxx,yyyyyy%
    Belt length change in % of total belt length.

15. Belt drift tr=xx,yycm
16. Mean Value I –mitt=xxx,yy%

    Percentage related to nominal feed rate.
17. Variance I –var=xxx,yyy%

    Percentage related to nominal feed rate.
18. Max. Belt Load QMAX=xxx%
19. Idling Portion TQ <MIN=xxx%
20. Latest Taring (Date) xxx,yy%

    Percentage related to nominal belt load.
21. AA1=xxx,yyymA

    Analog output current.
22. ZO: E yy xxxx

    Pulses output of external totalizing counter.

Chapter 7. Event Messages

All significant weigher’s functions are internally monitored. In case of any fault or error, its event message code will be showed in the lower left field of display. If several events happen at the same moment, priority sequence is arranged as: ALARM, WARNING 1, WARNING2.

Press to acknowledge events. Call “display events” function to review event messages .

1. System Messages S

S1 Memory Error

Program and parameters in memories are checked in cycles. In most cases, if an error is found, scale can no longer be operated.

S2 No Release

External release signal missed, scale can no longer be operated.

S3 Maintenance v>vmin

Total ON-time of conveyor belt and measurement is exceeded.

See parameters: K03, K04

S4 Maintenance Interval – Elect.

During Power -ON time of INTECONT , if necessary, requisite maintenance work may be performed.

S5 Password Active

Within 2 minutes of password being active, calibration and service functions can be called from normal operation state

2. Electrics E

E1 Power Failure

Power supply is failed or cut off.

Feed amount can not be calculated during this period.

E2 GA1 Short Circuit

Short circuit or breakage happens in speed transducer cable.

Operation of weigher can not proceed.

E3 Not dedicated

E4 Imp/Belt Short Circuit

Short circuit of breakage in cable of belt circuit cell.

See parameter Q07

E5 Stand-By

3. Calibration C

C1 L/C Input

Load cell cable is broken , connected in a wrong way or voltage of power supply is low. See parameter Q08.

C2 GA1 Input

Speed transducer output frequency is lower than 5Hz or exceeds 2700Hz. See parameter Q03.

C8 Slip Error

Belt length measured by belt circuit transducer is changed.

4. Maximum H

H1 I > MAX.

Actual feed amount exceeds preset Max. value.

H2 Belt Load > MAX.

Actual belt load exceeds preset Max. value.

H3 V > MAX.

Actual belt running speed exceeds preset Max. value.

H4 L/C Input > MAX.

Weighing overload leads to measurement error.

5. Minimum L

L1…L4 are relevant to H1…H4 in turn. Only that L1…L4 exceeds Min. value.

Chapter 8. Installation

1. Selection of Installation Position

For the convenience of installation ,commission and for guarantee the measurement precision of weighing system, it is better to install the weigher on the horizontal section of belt conveyor. The length of horizontal section is better to exceed 7m (distance of eight groups of idlers). The weighing frame (Scale body) should be installed in the position of two groups of idlers in the middle and ensured of having at least separate three groups of horizontal idlers both behind and ahead of the weighing frame.

2. Installation Order and Requirements

(1) Preparation

- When the installation position is chosen, the eight groups idlers of conveyor are taken down to measure their taper and longitudinal movement. Taper should be smaller than 0.1 mm and longitudinal movement be less than 0.2mm. In case of exceeding the allowances , those idlers should be changed or repaired. Diameters of eight groups of idlers should be in accordance. Select two groups of idlers with fittest geometrical dimensions as weighing idlers.
- Check the rigidity of belt conveyor frame. If it isn't strong enough, strengthen the weak parts of the frame, and try to improve conveyor construction rigidity so as to eliminate phenomenon of moving up and down of the belt when running.
- Take down the supporter for two groups of idlers in the middle.

(2) Installation

(Refer to installation dimension and outline drawings)

- Lift the weighing frame to the installation position determined. Accurately measure installation place according to installation dimension and outline drawings. The center line of weighing frame and conveyor should be in accordance. The adjustable screws should be welded to the frame of conveyor.

- Take off the supporter for two middle groups of weighing idlers from the conveyor and weld the idlers supporter to the weighing frame.
- Fix the groups of idlers chosen or well repaired to relevant frame.
- Adjust adjustable screws of the weighing frame. Calibrate the weighing frame horizontally and adjust the idlers for weighing section higher about 5mm than those for conveying section in horizontal surface line.
- Install the speed measuring device.
- Dismount the small pieces of protective corner iron fixed between the supporter and weighing unit so as to let bearing nuts of weighing unit press on the load cell.
- The weigher instrument is a wall-mounted type. Fix four installation supporters to the weigher cabinet, then, according to required dimensions in the drawing, install the whole cabinet in a control room.
- Connect cables for the cabinet according to the connection diagram. The wiring end is in instrument cabinet. Cables should be guided in through a protective conduit at the bottom of the cabinet.

3. Enter parameters according to technical parameters sheets and follow the required sequence to make program setting, calibration and commission .

Chapter 9. Maintenance

1. Regularly clean dust on load cell, weighing device and parallel leaf spring.
2. Regularly check swing pole of speed measuring unit and measuring wheel active condition, to guarantee its sensitive movement. Prevent the adhesive band around the measuring speed wheel from falling off. The measuring speed wheel should be normally pressed on the belt of conveyor.
3. Regularly check tension adjusting device of belt conveyor in order to keep belt tension force balance.
4. When repair or stop the weigher for a long time, protective corner iron of weighing frame should be turned tight and the bearing screw is departed from load cell so as to prevent it from damage.
5. Prevent persons or heavy matter from staying on the weighing section and avoid the load cell to be damaged due to overload.
6. Instruments should be checked and repaired only by technicians or professional workers. Except regular cleaning of dust, the control cabinet should not be opened , meters be dismounted and repaired by any unqualified person .
7. Attached to each belt weigher, a set of technical data and parameter sheets which contains related data and parameters is provided. Please follow the requirements and replace any damaged part by the new one of the same type.