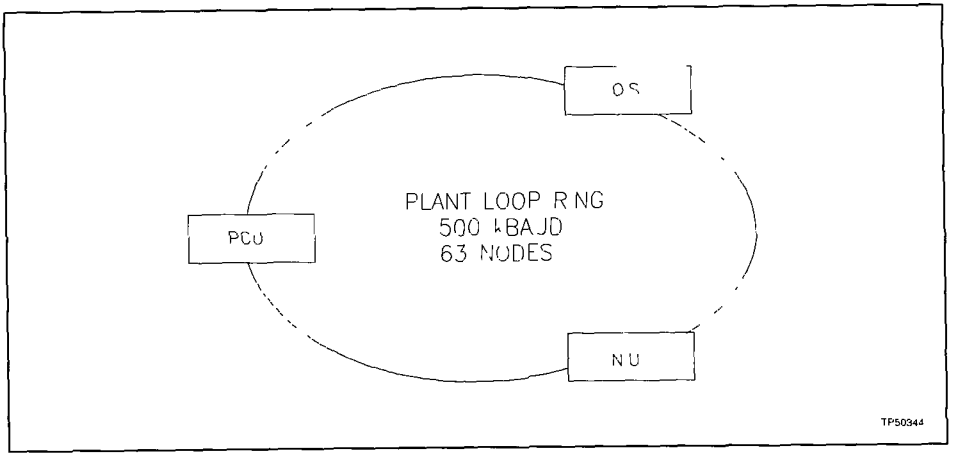
Bailey® infi 90®

Specification

E96–650

Plant Loop Communication System



Features

- Plant Loop provides a plant–wide communication highway
- 500 kobaud data rate provides timely information exchange
- Multiple self–checking features including positive message acknowledgment and cyclic redundancy checks for data integrity
- All master system using store and forward techniques requires no traffic director

Introduction

P ant Loop s a h gh speed ser a commun cat on h ghway that a NF 90 modu es share The P ant Loop r ng supports up to 63 nodes Each node can be up to 2 000 meters from the next node A P ant Loop r ng may nterface to other P ant Loop r ngs or act as a sub oop r ng to the *INFI NET Commun cation* Network

Except on report ng and store and forward commun cat on methods prov de for nformat on transfer These methods essen respor se t me a d nc ease data throughput W th Except on Report ng on y data that changes n the process s sent to the oop

P ant Loop prov des mu t p e nterfaces to accommodate d fferent node types These nterfaces use state of the art NF 90 modu es **Table 1** sts the P ant Loop modu es for each nterface

TABLE 1 Plant Loop Modules

PROCESS CONTROL UNIT INTERFACE

Interface	Modules	Hardware Description
PCU	NL M03 NB M02	Loop nterface Modu e Bus Interface Modu e

PLANT LOOP TO COMPUTER INTERFACE (01)

Interface	Modules	Hardware Description
NPC 01	NL M03 NS M01 NPTM01	Loop nterface Modu e Ser a nterface Modu e Po nt Tab e Modu e

PLANT LOOP TO COMPUTER INTERFACE (02)

Interface	Modules	Hardware Description
NPC 02	NL M03 NBTM01 NPCT01	Loop nterface Modu e Bus Transfer Modu e P ant Loop to Computer Transfer Modu e

PLANT LOOP TO PLANT LOOP REMOTE INTERFACE

Interface	Modules	Hardware Description
NPPR01	NLIM03 NBTM01 NPPT01	Loop nterface Modu e Bus Transfer Modu e P ant Loop to P ant Loop Transfer Modu e

***INFI–NET* TO PLANT LOOP LOCAL INTERFACE**

Interface	Modules	Hardware Description
N PL01	N PT01 NN S01 (2)	*nf Net to P ant Loop* Transfer Modu e Network nterface S ave

Process Control Unit Interface (PCU)

The Process Contro Un t nterface (**Figure 1**) has a Loop nterface Modu e (NL M03) and a Bus nterface Modu e (INB M02) Th s nterface g ves the PCU access to P ant Loop The L M nks the node to P ant Loop The B M commun cates w th the master modu es v a the modu e bus *and ma nta ns the Process Contro Un t database*

The B M po s modu es for except on reports at se ectab e po rates up to 4 po cyc es/second t groups messages w th a common dest nat on and then sends one arge message to that dest nat on Th s method s gn f cant y ncreases data throughput

The L M and B M do hardware and software secur ty checks cont nuous y They take the node off ne w thout break ng the oop (th s s true for a P ant Loop nterfaces) f they f nd any errors

Hardware redundancy features two pa rs of modu es The pr mary pa r does a system commun cat on funct ons wh le the secondary pa r wa ts n standby mode f the pr mary fa s the secondary comes on ne w thout any nterrupt on of process commun cat on or oss of data **Figure 2** s a b ock d agram of the redundant structure

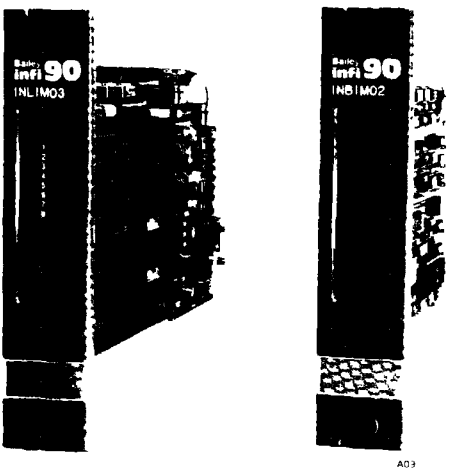


FIGURE 1 Process Control Unit Interface Modules

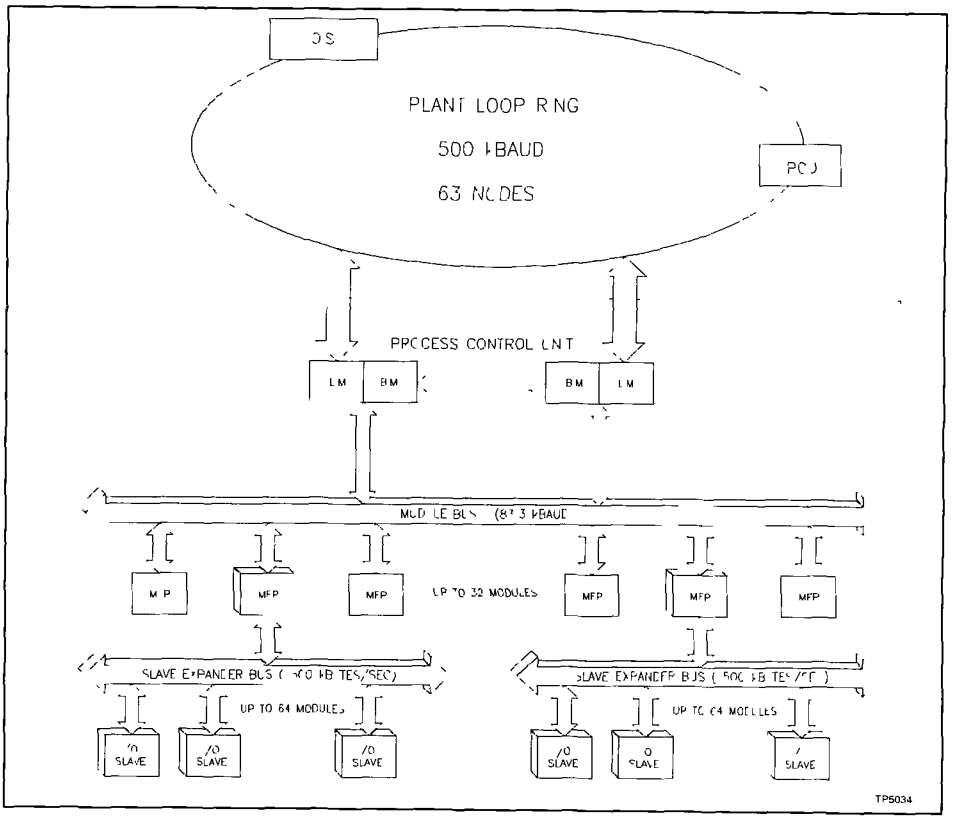


FIGURE 2 Redundant Process Control Unit Interface

Plant Loop to Computer Interface (PCI)

The Plant Loop to Computer Interface consists of a Loop Interface Module (INLIM03) related bus transfer modules and a database module. This interface allows computer access to point data through an RS-232-C serial link at rates up to 19.2 kbaud. When the PCI receives a command from the host it executes the command and then replies back to the host.

Data Acquisition

A database of up to 5,000 points is built in the PCI by the host computer. The host uses data acquisition commands to access this database.

Configuration

The PC can download control strategy configurations to NF 90 modules You can also use the interface to tune and read block outputs from an operator console or host computer

Process Control

The command sets the host computer change setpoints and control outputs (for analog and digital

process requirements) The PC can supply data values as except on reports to NF 90 modules

Security

The LIM and bus transfer modules do continuous hardware and software checks for module security You can also assign a password to prevent unauthorized configuration changes or data acquisition

See **Figure 3** for a block diagram representation of the structure

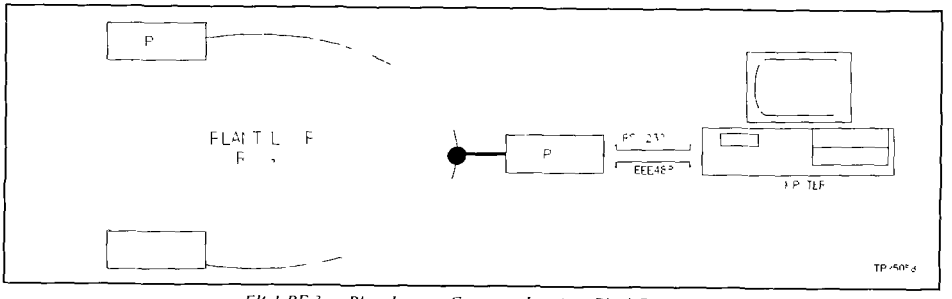


FIGURE 3 Plant Loop to Computer Interface Block Diagram

Plant Loop to Plant Loop Remote Interface (PPR)

The Plant Loop to Plant Loop Remote Interface (PPR) has a Loop Interface Module (LIM) Bus Transfer Module (BTM) Plant Loop to Plant Loop Transfer Module (PPT) and related support hardware

Operation

The Plant Loop to Plant Loop Remote Interface is the communication link between a local loop and one or more remote loops The local loop uses the PPR to receive analog/digital data except on reports and exercise control The PPR has a 5 000 block except on report data capacity Data throughput depends upon point type combinations Refer to **Table 2** for throughput times

There are two switch selectable modes for one way and two way control In one-way control except on reports come from up to 32 remote loops to the local loop

The local loop always initiates control and commands in two way control the PPR interfaces only two plant loops and supports bidirectional control and except on reports See **Figures 4** and **5** for examples of control *configurations*

You can link remote Plant Loop rings to a central ring through modems phone lines microwave and radio *transceivers*

Redundancy

Two separate Gateways are required for redundancy On start up one Gateway acts as the primary the other as backup If the primary fails the backup assumes control *immediately with no interruption of point control or loss of* data

TABLE 2 Message Throughput

Point Type	Number of Bytes	Time per Point	Points per Second
Stat on	19	10 4 msec	96
Ana og	8	4 7 msec	214
Digital	5	3 1 msec	322
Remote Contro Memory (RCM)	7	4 1 msec	241
Remote Manua Set Constant (RMSC)	7	4 1 msec	241
Dev ce Dr ver	7	4 1 msec	241

NOTE. These f gures are est mates The actua throughput depends on the comb nat or s of the data types sent at a g ven nstant of t me

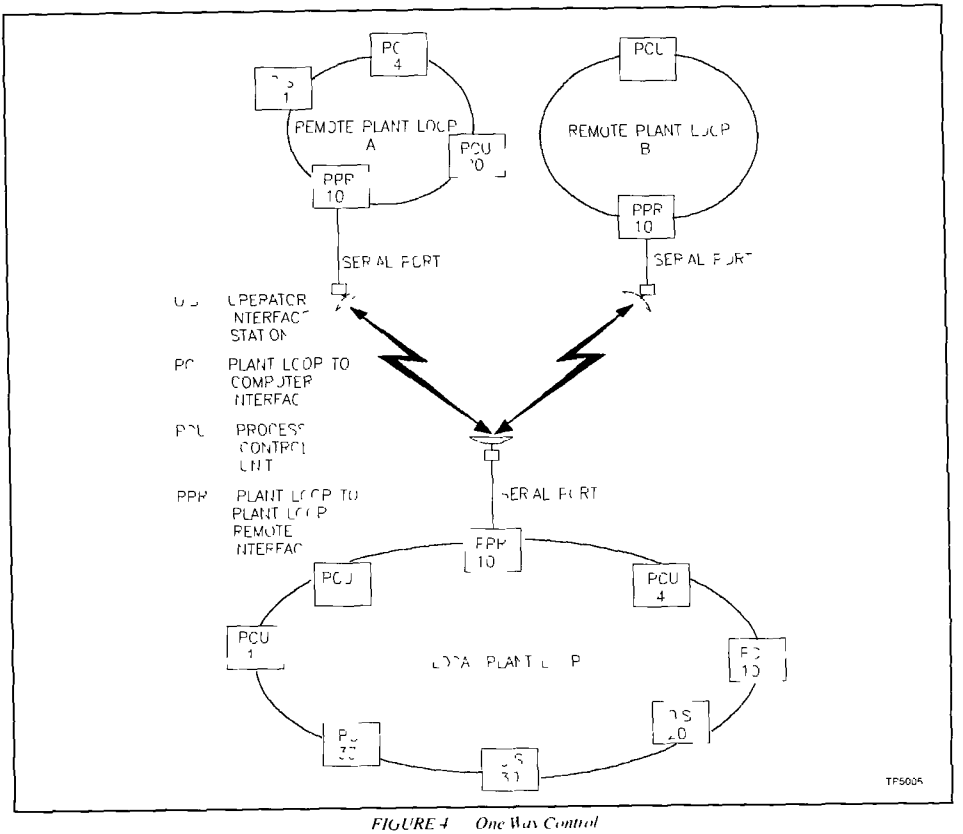


FIGURE 4 One Way Control

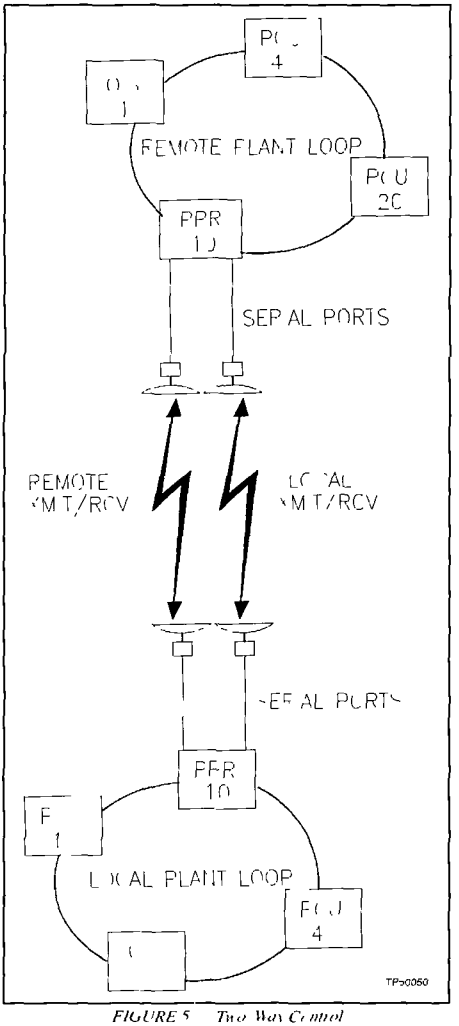


FIGURE 5 Two Way Control

INFI–NET to Plant Loop Local Interface (IPL)

The INFI NET to Plant Loop Local Interface links one INFI NET control ring to the Plant Loop. This interface converts data from the control ring so the Plant Loop can recognize it. The Plant Loop to INFI NET Transfer Module (INPT01) links the INFI module on the Plant Loop to the INFI Module on the INFI NET ring. The Network Interface Slave emulates a Loop Interface Module on the Plant Loop side of the interface. See **Figure 6** for a block diagram representation.

Data Flow

When a NIS receives a message it notifies the PT. The PT acknowledges and receives the message and stores it in its exception report database (random access memory). When the interface receives a message it takes responsibility for that message and verifies that it reaches its destination. Messages include exception reports, configuration data, control data and system status.

Redundancy

Redundancy uses a unique set of duplicate modules. Communication between the primary and secondary modules is through a serial link. Handshaking occurs on the module bus. The primary PT sends a copy of its database to the secondary. The secondary keeps track of the primary at all times. If the primary fails, the secondary takes over immediately without interruption.

Trending

Trending is automatic on the INFI NET side of the Gateway semi-automatic on the Plant Loop side.

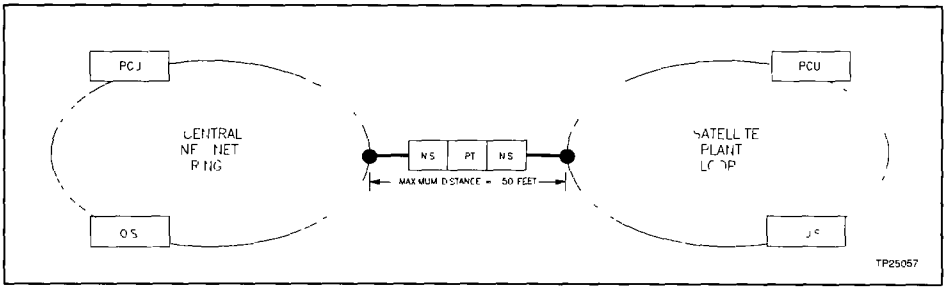


FIGURE 6 INFI NET to Plant Loop Local Interface Block Diagram

Related Hardware

P ant Loop to P ant Loop nterfaces (PPR) P ant Loop to Computer nterface (PCI) and the INF NET to P ant Loop nterfaces (IPL) nclude al term nat ons termination mount ng units cables and module mount ng un ts for operat on

Nomenclature	Description
NPC 01	P ant Loop to Comp.ter Interface 500 po nts RS–232 C ser a nterface w th term nat on un ts
INPCI02	Plant Loop to Computer Interface 5 000 points
232H	RS 232 C ser al nterface with terminat on modules
232L	RS 232 C ser a nterface w th term nat on un ts
–488H	IEEE–488 parallel nterface with termination modules
488L	EEE–488 para e nterface w th term nat on un ts
NPPR01	P ant Loop to P ant Loop Remote nterface 5 000 po nts
232H	RS 232 C ser a nterface w th term nat on modu es
232L	RS 232 C seria nterface w th termination un ts
N PL01	nf Net to P ant Loop Loca nterface 5 000 po nts
H	w th term nat on modu es
L	w th term nat on un ts

The Process Contro Un t nterface requ res th s assoc ated hardware

Terminations	Cables
LIM Term nat on Un t NTPL01 L M Terminat on Modu e NIPL01 NTPL01/NIPL01 NTPL01/N PL01 **Module Mounting Unit** EMMU01/02/04 The L M/BIM each occupy one slot in the MMU	NKLM01 NKTM01 or NKTU02 NKPL01

Specifications

	LIM	BIM/BTM	SIM	PTM	PCT01	PPT01	IPT01
Memory							
RAM (kbytes)	4	16	16	16	512	512	512
ROM (kbytes)	64	256	24	256	256	256	256
Power							
+5 VDC (amps)	2	1 6	2	1 6	6	6 28	6 28
(watts)	10	8	10	8	30	31	31
+15 VDC (mA)	80		35		37	44	44
(watts)	1 2		0 525		0 55	0 66	0 6
15 VDC (mA)	80		30		18	21 6	21 6
(watts)	1 2		0 450		0 27	0 3	0 3
Communication Rates (k obaud)	500		19 2		19 2	19 2	19 2
Communication Ports (RS 232)	—		1		2	2	

	10 MHz	2 MHz	500 KHz
Communication Rates vs Maximum Cable Distance			
Coaxial Cable	2000 meters (6 562 feet)	4000 meters (13 124 feet)	4000 meters (13 124 feet)
Tw nax Cab e	1000 meters (3 281 feet)	2000 meters (6 562 feet)	2000 meters (6 562 feet)

Maximum Length Difference for Redundant Cables (Tw nax or Coax a)	800 meters (2 625 feet)
System Capability	63 nodes on P ant Loop Any comb nat on of PCU O S PC PPR PL
Mounting	Modu es mount n standard NF 90 modu e mount ng un ts
Environmental	Va ues are not ava ab e at th s t me
E ectromagnet c/Rad o *Frequency Interference*	Keep cab net doors c osed Do not use commun cat on equ pment any c oser than 2 meters (3 2 feet) from the cab net
Amb ent Temperature	0°C to +70°C (32°F to 158°F)
Re at ve H m d ty	0 to 95% up to 55°C (131°F) (non–condens ng)
Atmospher c Pressure	0 to 45% up to 70°C (158°F) (non–condens ng) Sea eve to 3 km (1 86 m es)
Certification	A modu es have been CSA cert f ed for use as process contro equ pment n an ord nary (non hazardous) env ronment

Spec f cat ons Sub ect to Change W thout Notice

For a comp ete st of censees representat ves and aff ates n over 50 countr es wor dw de contact

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