Annex C: National Electricity Transmission System Operator (NETSO) EDL Specification

CONTENTS

1   Introduction

Electronic Dispatch Logging was the principal mechanism by which power stations in the Pool received instructions from the National Electricity Transmission System Operator (NETSO) and redeclared availability and dynamic parameters to the NETSO.

Under NETA within the rolling Balancing Mechanism window, the balancing of the power system is the NETSO's sole responsibility. A secure, reliable and proven system for issue and acceptance of balancing instructions is a pre-requisite for the NETSO prior to first operation of the power system under NETA. The EDL approach has been adopted for NETA as it is familiar to many and therefore represents a low risk to the NETA programme against the target implementation date.

EDL is the means by which a Control Point for a single or number of BMUs communicates with the NETSO. Any Control Point who wishes to receive balancing market instructions and Ancillary Services instructions from the NETSO under NETA must have an EDL link to the NETSO. An overview of the interfaces with the NETSO under NETA was given in a DISG paper 19/01.

Logically the EDL system comprises four layers; Application, Communication, Server and Wide-area Network as illustrated in Figure 1.

- Application Layer. This contains the Man-Machine User Interface and other supporting processes. This layer is provided entirely by each of the NETSO and the Company responsible for the Control Point to meet their own individual requirements.

- Communication Layer[1]. This provides the interface between the application layer (often via a database) and the server layer (via messages). It is primarily the Communications Layer which implements the interface described in this document. This layer is provided by each of the NETSO and the Company responsible for the Control Point to meet both their own individual requirements and the functional requirements of the EDL Server Layer.

- Server Layer. This is that part of the Wide-area Network Layer which transfers data between origins and destinations within a network-server domain (transparent task to task communication) to provide the message delivery system. This layer is provided by the NETSO.

- Wide-area Network layer. For present purposes, this may be taken to include the lower layers (i.e. physical and data link layers) of the required communications stack. It may be TCP/IP (the NETSO's preferred option) provided by any platform vendor or DECnet provided by Compaq.

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[1] Not to be confused with the seven Communications Layers of the ISO OSI Model

Figure 1.   Process Layers in EDL System
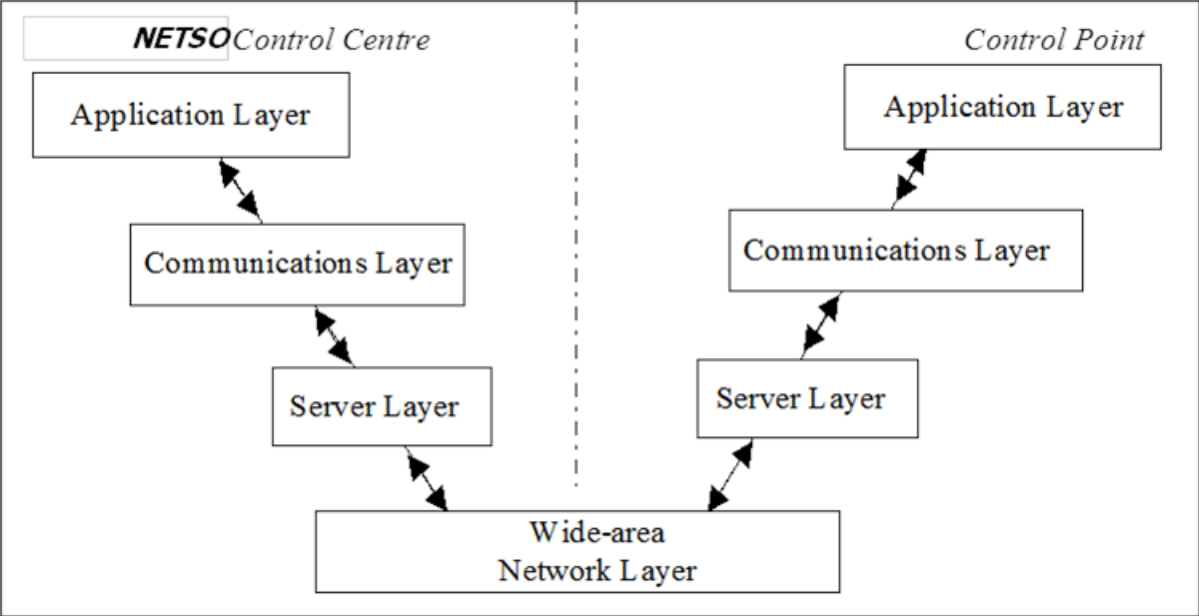
The logical implementation of the layer strategy is illustrated in Figure 2. The interface between the Communications Layer and the Server Layer is via messages deposited in four inter-process communications queues. It is the format of these messages that is the subject of this document.

Figure 2.   Diagram of EDL Processes
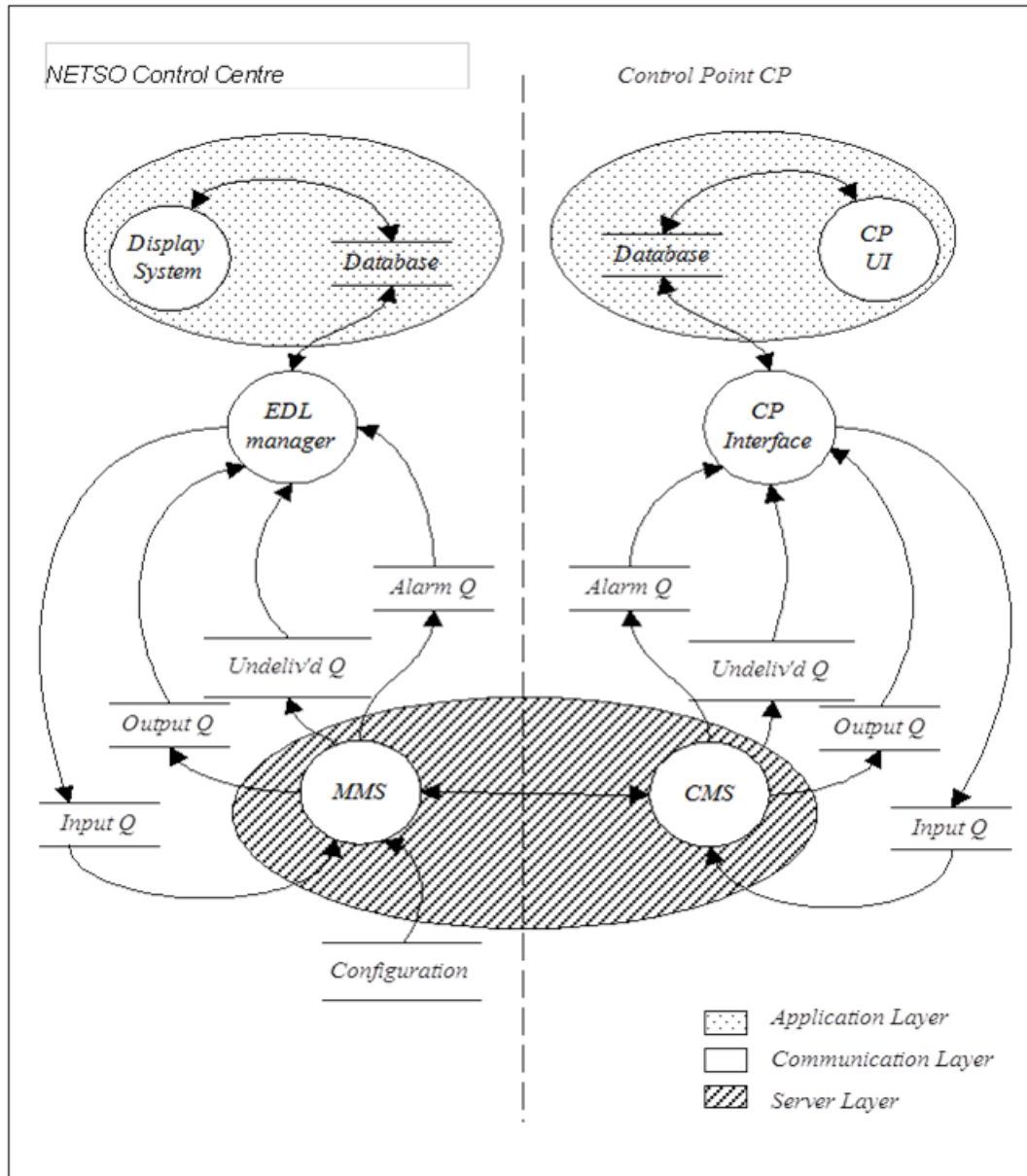
The Server Layer consists of a single process on each node. The Master Message Server (MMS) runs on the System Operator (NETSO) node and establishes connections to a Client Message Server (CMS) on each Control Point node.

1.1 Purpose and Scope

This document defines the structure and content of EDL instruction and submission messages that are required to implement Phase 1 of the NETA project.

1.2 Definitions

BMU	Balancing Mechanism Unit
BOA	Bid Offer Acceptance
EDL	Electronic Dispatch Logging – A message transfer mechanism
MEL	Maximum Export Limit
MIL	Maximum Import Limit
MNZT	Minimum Non-Zero Time
MZT	Minimum Zero Time
NDZ	Notice to Deviate from Zero
NETA	New Electricity Trading Arrangements
NTB	Notice to Deliver Bids
NTO	Notice to Deliver Offers
RDR	Run-down Rates
RUR	Run-up Rates
SEL	Stable Export Limit
SIL	Stable Import Limit

1.3 Related Documents

1.   NETA – A Draft Specification for the Balancing Mechanism and Imbalance Settlement, Version 1.2, July 1999, The Office of Gas and Electricity Markets.

2.   NETA – Data Validation, Consistency and Defaulting Rules, CT/24.12.0003.

2 Message Structure Details

2.1 Message Guidelines - General Description

All messages are simple ASCII text strings to aid development of Application and Communication layers by all parties. With the exception of Server Messages the messages comprise three parts.

- A message Prefix Part

- A message Header Part

- A message Data Part

The message Prefix Part is not transmitted between computer systems. It is used for communication between the Communications Layers and the Server Layers of the system on each node.

Message Prefix Parts are removed by the Server Layer from messages received from the Communication Layer before sending the messages to the Wide-area Network Layer for transmission.

Messages Prefix Parts are added by the Server Layer to messages received from the Wide-area Network Layer before sending the messages to the Communication Layer.

The message Header Part is constructed by the Communication Layers.

The message Data Part is constructed by the Communication Layer, usually based on information from the Application Layer, although some messages are originated by the Communications Layer.

This separation between Header & Data Parts is notional. In practice some elements of the Data Part will be processed by the Communications Layers. Furthermore the boundary between Header and Data Parts has been deliberately constructed such that the common components of all messages are arranged at the beginning of the Data Part and so may be viewed as either Header or Data Parts.

All dates and times[2] are referenced to Greenwich Mean Time.

Times stamps within message Data Parts are to a resolution of one minute. The standard DEC-VMS format is used. i.e. dd-mmm-yyyy hh:mm. (17 characters). Note that the valid range of the time component is 00:00 to 23:59.

Time stamps within message prefix parts are to a resolution of 10ms. The standard DEC-VMS format is used. i.e. dd-mmm-yyyy hh:mm:ss.nn. (23 characters). Note that the valid range of the time component is 00:00:00.00 to 23:59:59.99.

Fields within the Prefix Parts and the Data Parts are delimited by a space character. All message parts are terminated with a ^ character.

Fields containing variable length text items are left justified and space filled.

Fields containing variable length numeric items are right justified and zero filled.

The leading character of the day part of a date/time field may be a space.

Messages consist of three types; control, instruction and submission. Select/deselect control messages are sent from the NETSO to a Control Point while path/nopath control messages are sent from a Control Point to the NETSO. These messages control the availability of a BM Unit both to be instructed by the NETSO and to submit dynamic parameters. For instruction and submission messages to be exchanged, the NETSO must first have sent a select message while the Control Point must have sent a path message. Various message formats are defined for Ancillary Service instructions and Balancing Market Bid/Offer Acceptance instructions that are used by the NETSO to instruct a Control Point. Likewise, submission message formats are defined which allow a Control Point to submit various BM Unit dynamic parameters to the NETSO. If an error is detected by the Control Point in an instruction message, or by the NETSO in a submission message, the text of the message, or the truncated part thereof containing a reference number and log time will be sent back to the originator together with a pre-defined error code.

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[2]   Inter-machine time comparisons should only be to a minute resolution

2.2   Message Prefix Part

The message Prefix Part is different for each mailbox between the Communication Layer and the Server Layer. There is no Prefix Part on messages from the Communication Layer to the Server Layer on the station node, i.e. on messages in the CMS input mailbox.

Table 1.   Message Prefix Part for MMS Input Mailbox

Field Name	Start Position	Field Size	Description
Destination	1	6	Name of Control Point
Terminator	7	1	Part terminator character "^"

Table 2.   Message Prefix Part for MMS Output Mailbox

Field Name	Start Position	Field Size	Description
Destination	1	6	Name of Control Point
Time-Stamp	8	23	Time message received from Wide-area Network. Obtained from local node system clock.
Terminator	31	1	Part terminator character "^"

Table 3.   Message Prefix Part for CMS Output Mailbox

Field Name	Start Position	Field Size	Description
Time-Stamp	1	23	Time message received from Wide-area Network. Obtained from local node system clock.
Terminator	24	1	Part terminator character "^"

2.3   Message Header Part

The message Header Part is a packed string of four characters followed by a terminator. The character positions and sizes of the various fields are described in Table 4.

Table 4.   Message Header Part

Field Name	Start Position	Field Size	Description
Category	1	1	The category of message. Instruction, Submission etc. See Table 5
Type	2	1	The type of the message. This field carries the dialogue between Communication Layers. See Table 6 for details.
Instruction Type	3	1	NOTE: This field is only used for Instruction Category Messages and is a space for all other Categories of message See Table 7 for Details.
Error	4	1	Flag set to space by originating process. The message may be returned with the flag set. See 0 for details.
Terminator	5	1	Part terminator character "^"

Each transaction dialogue between Communication Layers consists of a single new outgoing message followed by one or more returned messages. Return messages are referenced to the original message and have return message types as shown in Table 6 They also retain the Message Category and Instruction Type of the original message.

Table 5.   Message Header Categories

Category	Description
C	Control Messages. See Table 9 for Data Part details
I	Instruction Messages. See Table 12, Table 13, Table 14, Table 15 and Table 16 for Data Part details
R	Submission Messages. See Table 18 for Data Part Details

Table 6.   Message Header Types

Code	Mnemonic	Direction	Meaning
N	New	Send	A new (real-time) message.
W	Waiting	Return	The remote Communications Layer has received & validated the referenced message. It is now waiting for manual action. This type is often called Technical Acknowledgement in earlier papers.
U	User Acknowledgements	Return	The remote operator has seen the referenced message.
A	Acceptance	Return	The remote operator accepts the referenced message.
R	Reject	Return	The remote operator rejects the referenced message.
T	Telephoned	Send	Upon re-connection of systems, messages that have been transmitted by telephone are sent electronically to allow the systems to reconcile themselves.
D	Dispute	Return	The remote system cannot reconcile a manually entered transaction.

Table 7.   Message Header Instruction Types

Instruction Type Code	Meaning
Space	Control Message, Submission Message, or EDL closed instruction messages. See Table 9, Table 12, Table 13, Table 14 and Table 18 for Data Part details
V	EDL Voltage Control Instruction. See Table 15 for Data Part details.
P	Pumped Storage Message. See Table 16 for details

Table 8.   Message Header Error Flags

Error Flag	Meaning
Space	Original message
E	An error is detected in a received message. Either the original message is returned to the originator with a four-character error code appended to it or a new message identifying the reference number of the original message together with a 4-character error code is sent to the originator. The error code may relate to the syntax or data consistency of the message
X	A message is returned to the originator. The message was valid and data consistent when first received, but while waiting for a user acknowledgement, other parameters have changed and the message is no longer consistent. It is thus flagged as expired i.e. a valid message that is no longer meaningful.

2.4   Message Data Part

The content of the Message Data Part depends primarily on the Message Category and secondarily on the Message Type. In the case of Instruction Category Messages the Instruction Type also influences the Message Data Part. Single space characters to further enhance the readability of the messages separate fields within the Message Data Parts. The Message Data Parts for each category are defined in the following tables.

2.4.1   Control Messages

The Message Data Part for control messages is a maximum of 56 characters. The length and contents of control messages depends on the nature of the message, the options are detailed in Table 9.

Table 9.   Message Data Part for Control Messages

Field Name	Start Position	Field Size	Description		Valid Type	Error Flag
Name	1	9	Control Point Name (VERSON message only) or BM Unit Name		All	
Ref Number	11	10	Message Reference Number		All	
Log Time	22	17	Time message logged by originating process		All	
Type	40	6	Specifies the type of control message and the structure of the type dependent message part.		N	
Type dependant			Type	Details		
			VERSON	See Table 11		
			SELECT	The Control Point is selected by the NETSO for EDL.		
			DESEL	The Control Point is de-selected by the NETSO for EDL		
			PATH	There is a path from the Control Point Communication Layer to the BM Unit operator.		

Field Name	Start Position	Field Size	Description		Valid Type	Error Flag
			NOPATH	There is NO path from the station Communication Layer to the BM Unit operator		
Error Code	40, 47 or 52	4	See Table 10 for meaning		Any	E
Terminator	44, 39, 46, 51, or 56	1	Part terminator character "^"		All	

Dispatch Instructions to an individual BM Unit via EDL will only take place once a PATH message from the control point, and a SELECT message from the NETSO have been sent. All other states will result in Instructions being issued by voice telephone.

Table 10.   Control Error Messages

Error Code	Description
C001	Invalid Control Point/BM Unit ID
C002	Invalid Control Type
C003	Unsupported Version Number
C004	Message arrived before VERSION accept

Submission and Control Messages can be issued at any time, irrespective of select and path states.

Table 11.   Message Data Part for Version Messages

Field Name	Start Position	Field Size	Description
Type	40	6	VERSON
Version	47	4	Latest Supported EDL Interface Definition. The field is a formatted numeric value. e.g. 0021 to specify version 2.1. The version number is changeable and reflects the current level of messages supported at the NETSO and the Control Point.

2.4.2   Instruction Messages

2.4.2.1   *Status Change Instruction Messages*

The message Data Part for Status Change instruction messages is a maximum of 104 characters.

Note that Status Change instructions are to be issued for Ancillary Service purposes to change the operating state of a BM Unit, for example perhaps to instruct a Unit to synch to the declared FPN, or to instruct a Unit off. If a MW output level is to be instructed, a Bid/Offer Acceptance closed instruction must be issued.

Table 12. Message Data Part for Status Change Instruction Messages

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Name	1	9	BM Unit Name	All	
Ref Number	11	10	Instruction Reference Number	All	
Log Time	22	17	Time message logged by originating process	All	
Start Instruction Code	40	5	This may be one of the following codes SYN, HTS or the numeric value 0.	N, T	
Start Reserve	46	3	Not used.	N, T	
Start Time	50	17	Start time of the instruction.	N, T	
Reason Code	68	3	Three character reason code applied to steam plant; the first character explains why the instruction was issued, the second character indicates whether the BM Unit is in frequency response mode.	N,T	
Target Instruction Code	72	5	This may be one of the following codes OFF, HTS, CHS or the numeric value 0.	N, T	
Target Reserve	78	3	Not used.	N, T	
Target Time	82	17	Target time of the instruction.	N, T	
Error Code	40, 100	4	See Table 17 for meaning	Any	E, X
Terminator	39, 44, 99 or 104	1	Part terminator character "^"	All	

Participants and Vendors should contact the NETSO for an up-to-date list of reason codes and an accompanying explanation.

2.4.2.2 *Bid / Offer Acceptance and Deemed Closed Instruction Message*

The message Data Part for a closed instruction is a maximum of 183 characters in length. A closed instruction will be sent to accept either BM Unit Bids or BM Unit Offers. The closed instruction must contain at least two MW / time value pairs up to a maximum of five value pairs that describe a closed volume of energy (in conjunction with the physical notification and any relevant previously accepted BOAs).

Table 13. Message Data Part for BOA and Deemed Closed Instruction Messages

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Name	1	9	BM Unit Name	All	
Ref Number	11	10	Instruction Reference Number	All	
Log Time	22	17	Time message logged by originating process	All	
Type	40	4	Type of instruction. BOAI or DEEM.	N, T	
BOA Number	45	10	BM Unit Bid/Offer Acceptance Number	N, T	
Number of Data Points	56	2	Count of the number of MW / Time pairs that make up this closed instruction. There must be a minimum of 2 pairs and a maximum of 5.	N, T	

Field Name	Start Position	Field Size	Description		Valid Type	Error Flag
MW$_1$	59	5	MW Value 1	±nnnn	N,T	
T$_1$	65	17	Time value 1			
MW$_2$	83	5	MW Value 2	Error code A	N, T	
T$_2$	89	17	Time value 2			
MW$_3$	107	5	MW Value 3	Optional MW / Time pair 3; Error code B	N, T	
T$_3$	113	17	Time value 3			
MW$_4$	131	5	MW Value 4	Optional MW / Time pair 4; Error code C	N, T	
T$_4$	137	17	Time value 4			
MW$_5$	155	5	MW Value 5	Optional MW / Time pair 5; Error code D	N, T	
T$_5$	161	17	Time value 5			
Error Code	40, 107 A, 131 B, 155 C, 179 D	4	See Table 17 for meaning		Any	E, X
Terminator	39, 44, 106, 111, 130, 135, 154, 159 178, 183	1	Part terminator character "^"		All	

2.4.2.3   *Reason Code Instruction Messages*

The message Data Part for a reason code instruction message is a maximum of 71 characters. This instruction sets the current reason code for a BM Unit. It is used, for example, to instruct a BM Unit's frequency response.

Table 14.   Message Data Part for Change of Reason Code Instruction Messages

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Name	1	9	BM Unit Name	All	
Ref Number	11	10	Instruction Reference Number	All	
Log Time	22	17	Time message logged by originating process	All	
Type	40	4	Type of instruction. REAS	N, T	
Reason Code	45	3	Three character reason code.	N, T	
Start Time	49	17	Start time of the instruction.	N, T	
Error Code	40, 67	4	See Table 17 for meaning	Any	E, X
Terminator	39, 44, 66 or 71	1	Part terminator character "^"	All	

Participants and Vendors should contact the NETSO for an up-to-date list of reason codes and an accompanying explanation.

2.4.2.4 *Voltage / MVAR Instruction Messages*

The message Data Part for Voltage Instruction messages is a maximum of 73 characters. All voltage control instructions are supported by EDL level 2 (VERSON 0020).

Table 15.   **Message Data Part for Voltage / MVAR Instruction Messages**

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Name	1	9	BM Unit Name	All	
Ref Number	11	10	Instruction Reference Number	All	
Log Time	22	17	Time message logged by originating process	All	
Type	40	4	Type of instruction. MVAR or VOLT	N, T	
Value	45	4	Target value as a whole number preceded by minus ("-" = negative value), plus ("+" = positive value), or space (" " = positive value) and with 3 digits (i.e. leading zero's always supplied). Note: + zero & - zero are treated as same instruction	N, T	
Target Time	50	17	Target time of the MVAR or VOLT instruction.	N, T	
Error Code	40, 68	4	See Table 17 for meaning	Any	E, X
Terminator	39, 44, 67 or 72	1	Part terminator character "^"	All	

2.4.2.5 *Pumped Storage Instruction Messages*

For Pumped Storage plant, currently Dinorwig and Ffestiniog stations, MW loading and pump instructions will use the closed instruction format given in Table 13.

The following message format will be used to set a pumped storage unit's:

- current reason code
- droop value
- low frequency relay value
- current operating state

Voltage instruction messages will be in the standard format as described in Table 15.

Table 16.   **Message Data Part for Pumped Storage Unit Instruction Messages**

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Name	1	9	Pumped Storage Unit Name	All	
Ref Number	11	10	Instruction Reference Number	All	
Log Time	22	17	Time message logged by originating process	All	
Reason Code	40	4	Four character reason code, (see below for more detail)	N, T	
Start Time	45	17	Start time of instruction.	N, T	

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
Target	63	5	Depending on the reason code: a mnemonic or a real value (see below for more detail).	N, T	
Target Time	69	17	Target time of the instruction.	N, T	
Error Code	87	4	See Table 17 for meaning	Any	E, X
Terminator	92	1	Part terminator character "^"	All	

Reason Codes can be one of the following

Reason Code	Description
LFSM	Limited Frequency Sensitive Mode
PSHF	Carry Primary, Secondary and High Frequency Response
EMRG	Emergency instruction (instruction to operate outside declared parameters)
FRES	Fast Response Required
LFRY	Instruction to set an Low Frequency relay
DROP	Droop instruction
BKDN	Breakdown

Target Field can be one of the following

Target	Description
MW	Reason code to be applied to the Pumped Storage BOA Closed Instruction
SH	Shutdown
SG	Spin Gen
SP	Spin Pump
Nn.nn	Set low frequency relay to nn.nn Hz. For example nn.nn could be 49.85. Where nn.nn is sent as 00.00 this should be interpreted as □remove LF relay setting□.
n.n	Set droop to n.n %

Truth table

	MW positive output	SH	SG	SP	MW negative output	nn.nn	n.n
LFSM	x	x	x	x	x		
PSHF	x		x				
EMRG	x	x	x	x	x		
FRES	x						
LFRY						x	
DROP							x
BKDN		x					

2.4.2.6 *Instruction Message Error Codes*

The error codes in Table 17 can be used with instruction messages.

Table 17. Instruction Message Error Codes

Error Code	Description
I001	Invalid BM Unit ID
I002	Invalid Reference Number (Current reference □ Last reference, or no previous reference to instruction with this number)
I003	General instruction syntax error (instruction parsing failed)
I004	Instruction received for a BM Unit with NO PATH
I005	Instruction received before Version Control Procedure completed
I006	Telephoned Instruction received with an Invalid Reference Number.
I007	Attempt to recover previously rejected instruction
I008	Unable to log instruction
I009	Invalid Telegraph Instruction Number
I010	Attempt to Reject Reconciliation Instruction which has already been sent to Settlements

2.4.3 Submission Messages

Submission messages conform to the message structure and error checking detailed in Reference 2. The structure of the Data Part depends on the parameters being re-declared, the options are detailed in Table 18.

The message Data Part for Submission messages is a maximum of 107 characters.

Table 18. Message Data Part for Submission Messages

Field Name	Start Position	Field Size	Description		Valid Type	Error Flag
Name	1	9	BM Unit Name		All	
Ref Number	11	10	Submission Reference Number		All	
Log Time	22	17	Time message logged by originating process		All	
Type	40	6	Specifies the type of Submission and the structure of the type dependent message part.		N, T	
Type Dependent	47	Max 57	Type	Details	N, T	
			MEL, MIL (error code A)	Table 19		
			RURE, RURI, RDRE, RDRI (error code B)	Table 20		
			NDZ, NTO, NTB, MZT, MNZT (error code C)	Table 21		
			SEL, SIL (error code D)	Table 22		
			MDVP (error code E)	Table 23		
Error Code	40 any,	4	Not used.		Any	E, X

Field Name	Start Position	Field Size	Description	Valid Type	Error Flag
	103 (A), 79 (B), 51 (C), 57 (D), 61 (E)				
Terminator	39, 44 102, 107, 78, 83, 50, 55, 56, 61, 60, 65	1	Part terminator character "^"	All	

Table 19.   Message Data Part Variations for MEL/MIL Submission Messages

Field Name	Start Position	Field Size	Description
Type	40	6	"MEL" or "MIL" keyword
Time from	47	17	Start time
MW from	65	9	MW at time from (±nnnnnnnn)
Time to	75	17	End time
MW to	93	9	MW at time to (±nnnnnnnn)

Table 20.   Message Data Part variations for RUR/RDR Export/Import Submissions

Submission messages for RUR/RDR parameters contain fields that are optional. Unused fields are treated as null values. Null values are specified by filling the field with '*' characters.   The three valid combinations of parameters and nulls are identified in 0.

Field Name	Start Position	Field Size	Description	Valid Combinations		
Type	40	6	"RURE", "RURI", "RDRE", or "RDRI" keywords			
Rate 1	47	6	First Rate	T	T	T
Elbow 2	54	5	Optional Second Elbow (±nnnn)	T	T	*****
Rate 2	60	6	Optional Second Rate	T	T	******
Elbow 3	67	5	Optional Third Elbow (±nnnn)	T	*****	*****
Rate 3	73	6	Optional Third Rate	T	******	******

Table 21.   Message Data Part variations for Single Time Value Parameter Submissions

Field Name	Start Position	Field Size	Description
Type	40	6	"NDZ", "NTO", "NTB", "MZT" or "MNZT keyword
Time value	47	3	Number of minutes

Table 22.   Message Data Part Variations for SEL/SIL Submission Messages

Field Name	Start Position	Field Size	Description
Type	40	6	"SEL" or "SIL" keyword
Value	47	9	MW level

Table 23.   Message Data Part for variations for Maximum Delivery Submission Messages

Field Name	Start Position	Field Size	Description
Type	40	6	"MDVP" keyword
MDV	47	11	Max Delivery Volume (MW hours)
MDP	59	3	Max. Delivery Period (minutes)

2.4.4   Submission Error codes

A submission message is automatically acknowledged by the NETSO using a message with the message Header Part "RW ^".

The submission undergoes syntax and validation checking. If the submission is valid, the return message with the message Header Part "RU ^" is sent to the Control Point; otherwise, if an error is encountered, a message with the message header part "RN E" is sent with a reason code appended.

Table 24.   Submission Error Codes

Error Code	Description
R001	Invalid syntax
R002	Invalid BM Unit
R003	Value out of bounds
R004	Invalid run rate break point
R005	Invalid run rate
R006	Invalid combination of run rates/breakpoints
R007	Invalid run rate breakpoint; breakpoints not monotonically increasing
R008	FROM time does not predate TO time
R009	Invalid FROM time
R010	Invalid TO time
R011	FROM time must be equal to or after SUBMISSION time
R999	Contact the NETSO

2.5 Undelivered Messages

There will be rare occasions when messages will not be acknowledged as successfully transferred from the Communications Layer on one node to the Communications Layer on another node. This may be due to

- the message was not transferred – communications failure
- the remote message server failed to acknowledge receipt of the successfully delivered message.

All such messages which cannot be delivered to the remote partner are deposited in the undelivered mailbox on the sending node. Any message Prefix Part in the input

mailbox is also echoed to the undelivered mailbox. The Communications Layer must monitor this mailbox, and possibly re-present the message when connection is re-established.

2.6 Alarm Messages

The Server Layer continuously monitors the Wide-area Network Layer. Whenever a connection with a remote partner changes, a message is deposited in the Alarm mailbox.

Table 25. Alarm codes for CMS Alarm Mailbox

Field Name	Start Position	Field Size	Description
Code	1	3	See 0
Time Stamp	5	23	Time alarm raised by Server Layer, obtained from local node system clock.

Table 26. CMS Alarm Codes

Alarm	Meaning
IC	Input channel connected
OC	Output channel connected
ID	Input channel disconnected
OD	Output channel disconnected
NX	Network Partner Exited

Table 27. Alarm codes for the MMS Alarm Mailbox

Field Name	Start Position	Field Size	Description
Destination	1	6	Name of BM Unit
Code	8	6	See 0
Time Stamp	15	23	Time alarm raised by Server Layer, obtained from local node system clock.

Table 28. MMS Alarm Codes

Alarm	Meaning
C-P	Primary Channel Connected
C-S	Secondary Channel Connected
D-P	Primary Channel Disconnected
D-P(R)	Primary Channel disconnected due to a link re-configuration
D-S(R)	Secondary Channel disconnected due to a link re-configuration
D-P(U)	Primary Channel disconnected due to a message being undelivered/unacknowledged
D-S(U)	Secondary Channel disconnected due to a message being undelivered/unacknowledged
D-S	Secondary Channel Disconnected
NX	Network Partner Exited